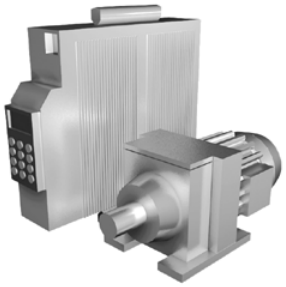
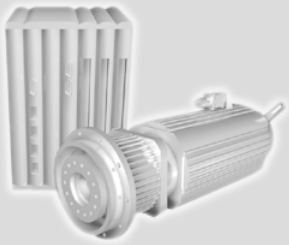
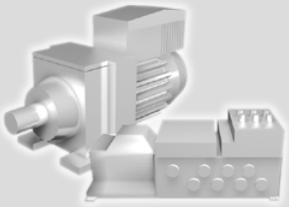
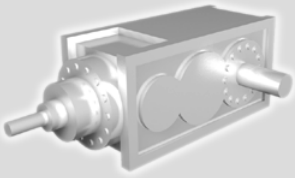
SEW EURODRIVE





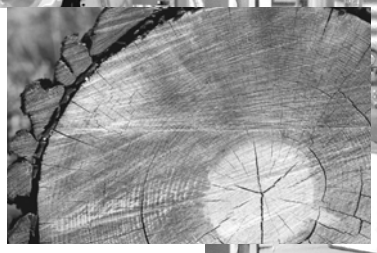




Explosion-Proof AC Motors, Asynchronous Servomotors

Edition 04/2007
11559411 / EN

Operating Instructions



SEW EURODRIVE

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1 General Information

1.1 Structure of the safety notes

The safety notes in these operating instructions are designed as follows:

Pictogram	SIGNAL WORD!
	Type and source of danger. Possible consequence(s) if the safety notes are disregarded. • Measure(s) to prevent the danger.

Pictogram	Signal word	Meaning	Consequences in case of disregard
Example: General danger Specific danger, e.g. electric shock	**DANGER!**	Imminent danger	Severe or fatal injuries
	WARNING!	Possible dangerous situation	Severe or fatal injuries
	CAUTION!	Possible dangerous situation	Minor injuries
	NOTE ON EXPLOSION PROTECTION	Important note on explosion protection	Suspension of explosion protection and dangers resulting from this
	STOP!	Possible damage to property	Damage to the drive system or its environment
	NOTE	Useful information or a tip Simplifies the handling of the drive system	

1.2 Rights to claim under limited warranty

A requirement of fault-free operation and fulfillment of any rights to claim under limited warranty is that you adhere to the information in the operating instructions. Consequently, read the operating instructions before you start working with the unit!

Make sure that the operating instructions are available to persons responsible for the plant and its operation, as well as to person who work independently on the unit. You must also ensure that the documentation is legible.

1.3 Exclusion of liability

You must comply with the information contained in these operating instructions to ensure safe operation of the explosion-proof electric motors and to achieve the specified product characteristics and performance requirements. SEW-EURODRIVE assumes no liability for injury to persons or damage to equipment or property resulting from non-observance of these operating instructions. In such cases, any liability for defects is excluded.

2 Safety Notes

2.1 Preliminary information

The following basic safety notes must be read carefully to prevent injury to persons and damage to property. The operator must make sure that the basic safety notes are read and observed. Make sure that persons responsible for the plant and its operation, as well as persons who work independently on the unit, have read through the operating instructions carefully and understood them. If you are unclear about any of the information in this documentation, please contact SEW-EURODRIVE.

2.2 General

Never install damaged products or take them into operation. Submit a complaint to the shipping company immediately in the event of damage.

During operation,motors and gearmotors can have live, bare and movable or rotating parts as well as hot surfaces, depending on their enclosure.

Explosive gas mixtures or dust concentrations in combination with hot, energized and moving parts of electrical machinery can cause serious injury or death.

Removing covers without authorization, improper use as well as incorrect installation or operation may result in severe injuries to persons or damage to machinery.

Consult the documentation for additional information.

2.3 Designated use

The electric motors are intended for industrial systems. They fulfill the applicable standards and regulations:

- Low Voltage Directive 73/23/EEC
- Guideline 94/9/EC
- pr EN 61241-0 Electrical apparatus for use in atmospheres containing combustible dust: General requirements
- EN 61241-1 Electrical apparatus for use in atmospheres containing combustible dust: Protection through housing "tD"
- EN 50281-1-1 Electrical apparatus for use in atmospheres containing combustible dust: Protection through housing
- EN 50281-1-2 Electrical apparatus for use in atmospheres containing combustible dust: Protection through housing
- EN 60079-0/EN 50014 Electrical apparatus for potentially explosive atmospheres: General requirements
- EN 60079-1/EN 50018 Electrical apparatus for potentially explosive atmospheres: Flameproof enclosure "d"
- EN 60079-7/EN 500019 Electrical apparatus for potentially explosive atmospheres: Increased safety "e"
- EN 60034 Rotating electrical machines

Technical data and information on the permitted conditions are given on the nameplate and in the documentation; they have to be observed under all circumstances.

2.4 Other applicable documentation

The following publications and documents have to be observed as well:

- "Explosion-Proof Gear Units R..7, F..7, K..7, S..7 Series, Spiroplan® W" operating instructions for gearmotors
- Operating instructions of the frequency inverter for motors powered by inverters
- Operating instructions of installed options, if applicable
- Corresponding wiring diagrams

2.5 Transportation

Inspect the shipment for any damage that may have occurred in transit as soon as you receive the delivery. Inform the shipping company immediately. It may be necessary to preclude startup.

Tighten installed eyebolts. They are only rated for the weight of the motor/gearmotor; do not attach any additional loads.

The built-in lifting eyebolts meet DIN 580. Always observe the loads and regulations listed in this standard. If the gearmotor is equipped with two suspension eye lugs or lifting eyebolts, then both of the suspension eye lugs should be used for transportation. In this case, the tension force vector of the slings must not exceed a 45° angle in accordance with DIN 580.

Use suitable, sufficiently rated handling equipment if necessary. Remove any transportation fixtures prior to startup.

2.6 Installation / assembly

Follow the instructions in Sec. "Mechanical Installation"!

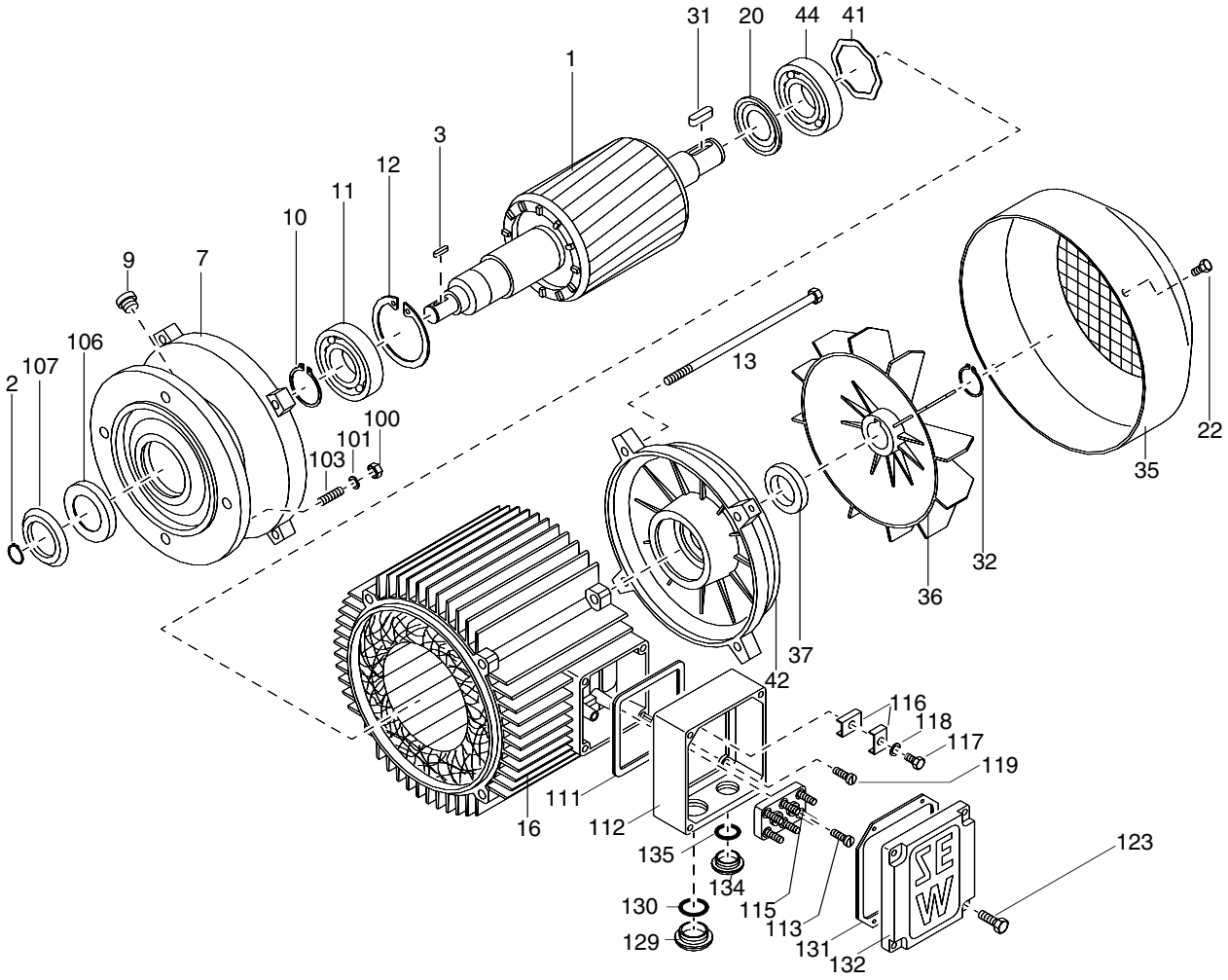
2.7 Inspection / maintenance

Follow the instructions in Sec. "Inspection / Maintenance"!

3 Motor Design

	NOTE
	The following illustration is intended to explain the general structure. Its only purpose is to facilitate the assignment of components to the spare parts lists. Discrepancies are possible depending on the motor size and version!

3.1 AC motor



1 Rotor, complete	31 Key	107 Oil-flinger ring	131 Sealing ring
2 Circlip	32 Circlip	111 Gasket	132 Terminal box cover
3 Key	35 Fan guard	112 Terminal box lower part	134 Screw plug
7 Flanged end shield	36 Fan	113 Machine screw	135 Sealing ring
9 Screw plug	37 V-ring	115 Terminal board	
10 Circlip	41 Equalizing ring	116 Terminal clip	
11 Deep groove ball bearing	42 Non drive-end bearing shield	117 Hex head bolt	
12 Circlip	44 Deep groove ball bearing	118 Lock washer	
13 Hex head screw (tie rod)	100 Hexagonal nut	119 Machine screw	
16 Stator, complete	101 Lock washer	123 Hex head bolt	
20 Nilosring	103 Stud	129 Screw plug	
22 Hex head bolt	106 Oil seal	130 Sealing ring	

3.2 Nameplate, unit designation

3.2.1 Nameplate of category 2 motors

Example:
Category 2G

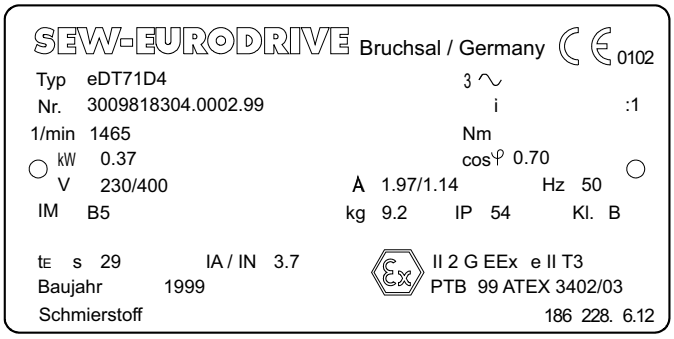


Figure 1: Nameplate for category 2G

Example:
Category 2GD

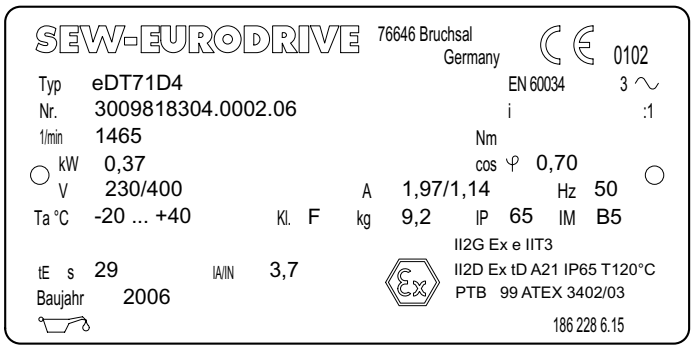
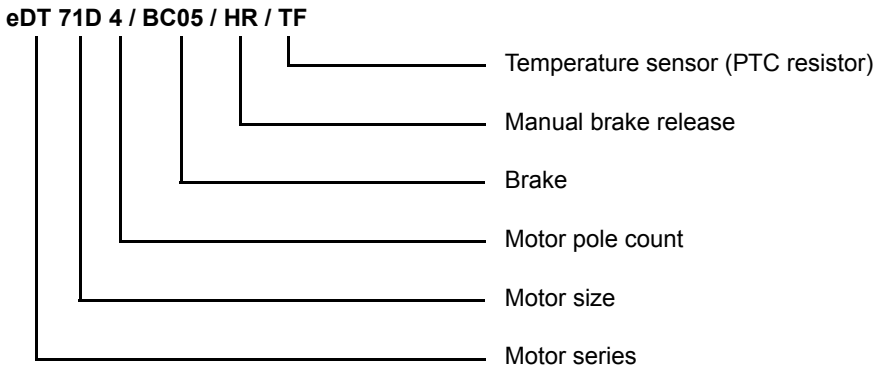


Figure 2: Nameplate for category 2GD

3.2.2 Unit designation

Example: AC (brake) motor in category 2G



3.2.3 Nameplate of category 3 motors: Motor series DR, DT, DV

Example: Category 3GD

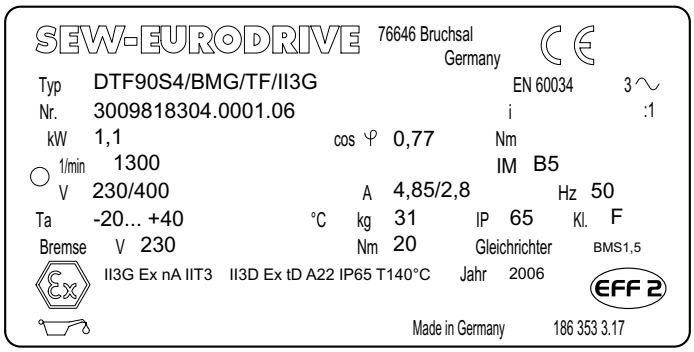


Figure 3: Nameplate

3.2.4 Unit designation

Example: AC (brake) motor in category 3G

DFT 90S 4 / BMG / TF / II3G

- Unit category
- Temperature sensor (PTC resistor)
- Brake
- Motor pole count
- Motor size
- Motor series

3.2.5 Nameplate of category 3 motors: CT, CV motor series

Example:
Category 3D

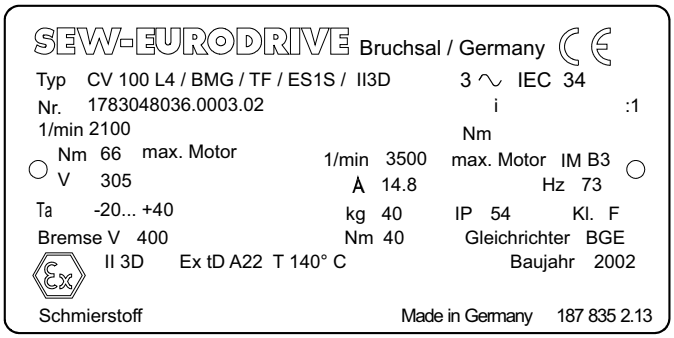
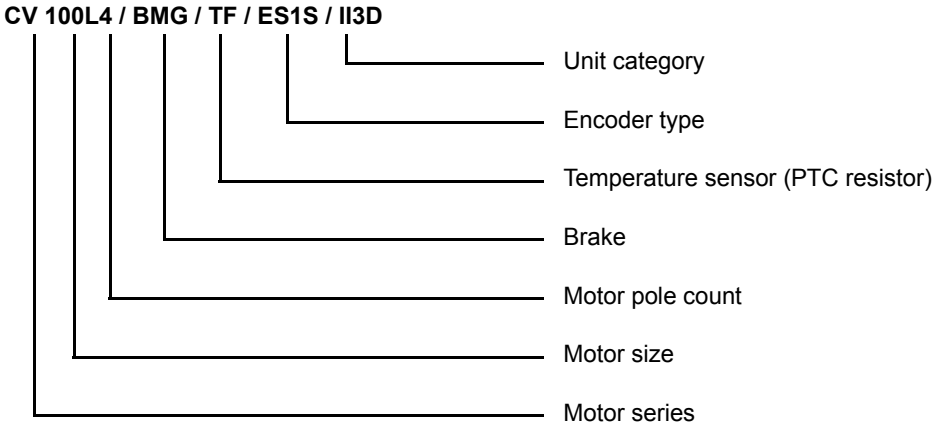


Figure 4: Nameplate

3.2.6 Unit designation

Example: Asynchronous servo (brake) motors in category II3D



4 Mechanical Installation

	NOTE
	Observe the safety notes in section 2 during installation.

4.1 Before you start

The drive may only be installed when

- the entries on the nameplate of the drive match the voltage supply system.
- the drive is undamaged (no damage caused by transportation or storage).
- it is certain that the conditions for the operational environment are complied with (see Sec. "Safety Notes").

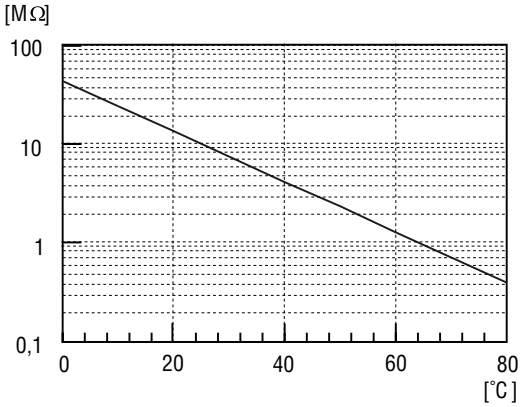
4.2 Mechanical installation

4.2.1 Preliminary work

Long-term storage of motors

- Please note that the grease utilization period of the ball bearings is reduced by 10 % each year after storage periods exceeding one year.
- Check whether the motor has absorbed moisture as a result of being stored for a long time. Measure the insulation resistance for this purpose (measuring voltage 500 V).

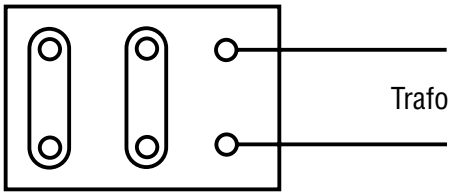
The insulation resistance (see following figure) varies greatly depending on the temperature. The motor must be dried if the insulation resistance is not adequate.



Drying the motor

Heat the motor:

- with hot air or
- via isolation transformer
  - Connect the windings in series (see following figure)
  - Auxiliary AC voltage supply max. 10 % of the rated voltage with max. 20 % of the rated current



The drying process is finished when the minimum insulation resistance has been exceeded.

Check terminal box whether:

- the inside is clean and dry
- the connections and fixing parts are free from corrosion
- the joint seals are OK
- the cable glands are sound, otherwise clean or replace them

4.2.2 Installation tolerances

Shaft end	Flanges
Diameter tolerance in accordance with DIN 748 • ISO k6 for ∅ ≤ 50 mm • ISO m6 for ∅ ≥ 50 mm • Center bore in accordance with DIN 332, shape DR..	Centering shoulder tolerance to DIN 42948 • ISO j6 for ∅ ≤ 230 mm • ISO h6 for ∅ ≥ 230 mm

4.2.3 Installing the motor

- The motor or gearmotor may only be mounted or installed in the specified mounting position on a level and torsionally rigid support structure that is not subject to shocks.
- Clean the output shafts thoroughly to ensure they are free of anti-corrosion agents (use a commercially available solvent). Do not allow the solvent to penetrate the bearings and shaft seals – this could damage the material.
- Carefully align the motor and the driven machine to avoid placing any unacceptable strain on the motor shafts (observe permitted overhung load and axial load!).
- Do not butt or hammer the shaft end.
- Ensure there is sufficient clearance around the unit to allow for adequate cooling. Furthermore, the unit must be positioned in such a way that it does not reuse the air warmed by other devices.
- Balance components for subsequent mounting on the shaft with a half key (output shafts are balanced with a half key).

	NOTE ON EXPLOSION PROTECTION
	• If using belt pulleys: – Only use belts that do not build up an electrostatic charge. – Do not exceed the maximum permitted overhung load; for motors without gear units, see Sec. "Maximum permitted overhung loads" (page 96) (page 98). • Use an appropriate cover to protect motors in vertical mounting positions from objects or fluids entering (protection cowl C)!

Installation in damp locations or in the open

- Use suitable cable glands for the incoming cable (use reducing adapters if necessary) according to the installation instructions.
- Coat the threads of cable glands and screw plugs with sealant and tighten them well – then coat them again.
- Seal the cable entry well.
- Clean the sealing surfaces of the terminal box and the terminal box cover carefully before re-assembly; gaskets have to be glued in on one side. Replace brittle gaskets.
- Restore the anticorrosion coating if necessary
- Check enclosure according to nameplate

5 Electrical Installation

	NOTE
	• Observe the safety notes in section 2 during installation. • Switch contacts in utilization category AC-3 to EN 60947-4-1 must be used for switching the motor and the brake.

5.1 General information

5.1.1 Additional regulations for potentially explosive atmospheres

In addition to the generally applicable installation regulations for low-voltage electrical equipment (e.g. in Germany: DIN VDE 0100, DIN VDE 0105), it is also necessary to comply with the special provisions on setting up electrical machinery in potentially explosive atmospheres (operating safety regulations in Germany: EN 60079-14; EN 50281-1-2; EN 61241-14 and specific provisions for the machine).

5.1.2 Using the wiring diagrams

Connect the motor only as shown in the wiring diagram included with the motor. Do not connect or start up the motor if this wiring diagram is missing. You can obtain the valid wiring diagram free of charge from SEW-EURODRIVE.

5.1.3 Cable entries

The terminal boxes have metric threaded holes according to EN 50262 or NPT threaded holes according to ANSI B1.20.1-1983. All metric cable entries are supplied with ATEX certified closing plugs.

To establish the correct cable entry, the sealing plugs must be replaced by ATEX approved cable glands with strain relief. Select the cable screw fitting according to the outer diameter of the cable used. The IP enclosure of the cable entry must be at least as high as the IP enclosure of the motor.

All cable entries that are not required must be sealed off with an ATEX certified closing plug after completion of the installation (→ maintaining the enclosure).

5.1.4 Equipotential bonding

In accordance with EN 60079-14, IEC 61241-14 and EN 50281-1-1, a connection may have to be established to an equipotential bonding system. Note Sec. "Improving the grounding (EMC)" (page 19).

5.2 Wiring notes

Comply with the safety notes during startup.

5.2.1 Protection against interference from brake control systems

Do not route brake cables alongside switched-mode power cables, as otherwise there is a risk of disrupting brake control systems.

Switched-mode power cables include in particular:

- Output cables from frequency inverters and servo controllers, converters, soft start units and brake units
- Supply cables for brake resistors and similar options

5.2.2 Protecting motor protection devices against interference

To protect SEW motor protection devices (temperature sensors TF, winding thermostats TH) against interference:

- Route separately shielded supply cables together with switched-mode power lines in one cable.
- Do not route unshielded supply cables together with switched-mode power lines in one cable.

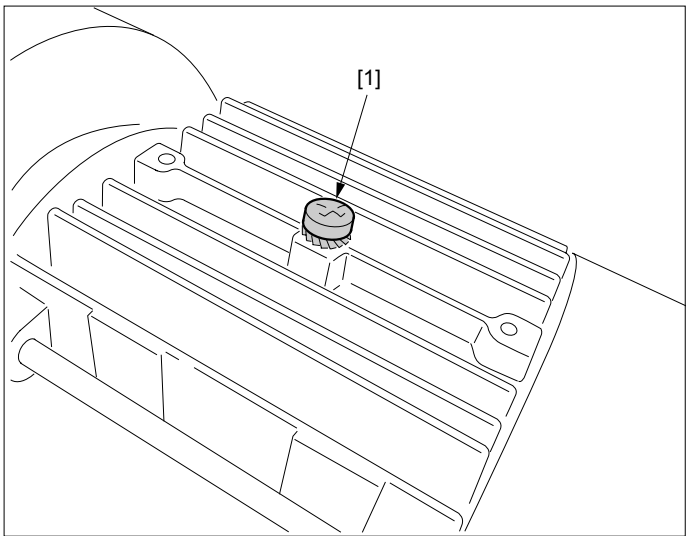
5.3 Special aspects for operation with a frequency inverter

When motors are powered from inverters, you must adhere to the wiring instructions issued by the inverter manufacturer. It is essential to observe Sec. "Operating Modes and Limit Values" and the operating instructions of the frequency inverter.

5.4 Improving the grounding (EMC)

For improved, low-impedance grounding at high frequencies, we recommend using the following connections with the DR/DV/DT AC motors:

- Size DT71 ... DV 132S: [1] M5x10 thread rolling screw and 2 serrated lock washers to DIN 6798 in the stator housing.



- Size DV112M... DV280: Screw and 2 serrated lock washers in the bore of the eye bolt.

  Thread size of the eye bolt:

  – DV112 / 132S: M8
  – DV132M ... 180L: M12
  – DV200 ... 280: M16

5.5 Environmental conditions during operation

5.5.1 Ambient temperature

The temperature range of -20 °C to 40 °C must be ensured unless specified otherwise on the nameplate. Motors intended for use in higher or lower ambient temperatures have the appropriate designation on the nameplate.

5.5.2 Installation altitude

The maximum installation altitude of 1000 m above sea level must not be exceeded.

5.5.3 Hazardous radiation

Motors must not be subjected to hazardous radiation (such as ionizing radiation). Contact SEW-EURODRIVE if necessary.

5.5.4 Hazardous gases, vapors and dusts

If used according to their designated use, explosion-proof motors are incapable of igniting explosive gases, vapors or dusts. However, explosion-proof motors may not be subjected to gases, vapors or dusts that endanger operational safety, for example through

- Corrosion
- Damage to the protective coating
- Damage to the sealing agent

etc.

5.6 Motors and brakemotors in category 2G, 2D and 2 GD

5.6.1 General information

The explosion-proof / dust explosion-proof SEW-EURODRIVE motors of the eDR, eDT and eDV series are designed for the following application zones.

Motor category	Area of application
2G	Application in zone 1 and compliance with the design requirements for equipment group II, category 2G.
2D	Application in zone 21 and compliance with the design requirements for equipment group II, category 2D.
2GD	Application in zone 1 or zone 21 and compliance with the design requirements for equipment group II, category 2GD.

5.6.2 Brakes in flameproof enclosure protection type "d"

In addition, SEW-EURODRIVE offers brakes in the determinant protection type "d" to EN 50018 or EN 60079-1 for use in potentially explosive atmospheres. The flameproof enclosure for brakemotors only applies to the brake cavity. The motor and the wiring space for the brake are designed in protection type "e".

5.6.3 Terminal boxes

Depending on the category, the terminal boxes have the following minimum degree of protection.

Motor category	Degree of protection
2G	IP54
2D	IP65
2GD	IP65

5.6.4 Code "X"

If the code "X" appears after the certification number on the declaration of conformity or the EC prototype test certificate, this indicates the certificate contains special conditions for safe application of the motors.

5.6.5 Temperature classes

The motors are authorized for temperature classes T3 and T4. The temperature class of the motor can be found on the nameplate, the declaration of conformity or the EC prototype test certificate supplied with the motor.

5.6.6 Surface temperatures

The maximum surface temperature is 120°C. Information about the surface temperature of the motor can be found on the nameplate, the declaration of conformity or the EC prototype test certificate

5.6.7 Protection against impermissibly high surface temperatures

The increased safety protection type requires that the motor is switched off before it reaches the maximum permitted surface temperature.

The motor can be protected with a motor protection switch or a positive temperature coefficient (PTC) thermistor. The type of motor protection is specified in the EC prototype test certificate.

5.6.8 Protection exclusively with motor protection switch

Note the following when installing the motor protection switch to EN 60947:

- **For categories 2G and 2GD:** With starting current ratio I_A/I_N listed on the nameplate, the response time of the motor protection switch must be less than the warm-up time t_E of the motor.
- The motor protection switch must trip immediately in the event of a phase failure.
- The motor protection switch must be approved by a notified body and assigned a corresponding inspection number.
- The motor protection switch must be set to the rated motor current indicated on the nameplate or in the prototype test certificate.

5.6.9 Protection exclusively with PTC thermistor (TF)

The positive coefficient thermistor must be evaluated using a suitable device. Observe the applicable installation regulations.

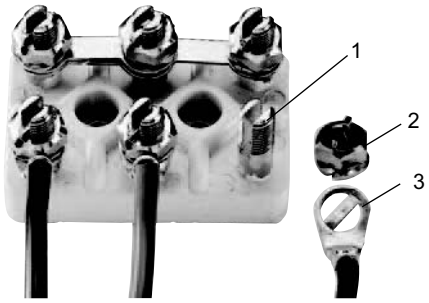
5.6.10 Protection with motor protection switch and additional PTC thermistor

The conditions stated for exclusive protection with motor protection switches also apply here. Protection with positive temperature coefficient thermistors (TF) only represents a supplementary protection measure which is irrelevant to certification for potentially explosive conditions.

	NOTE ON EXPLOSION PROTECTION
	Proof of the efficacy of the installed protective equipment is required prior to startup.

5.6.11 Motor connection

Motors with a terminal block with a slotted terminal stud [1] according to directive 94/9/EC (see following figure) are only allowed to be connected using lugs [3] to DIN 46295. The cable lugs [3] are attached using forcing nuts with an integrated lock washer [2].



Alternatively, a solid round wire can be used for the connection. The diameter of the wire must correspond to the width of the slot in the terminal stud (→ following table).

Motor size	Widths of terminal stud slot [mm]	Tightening torque of the forcing nut [Nm]
eDT 71 C, D	2.5	4.0
eDT 80 K, N		
eDT 90 S, L		
eDT 100 LS, L		
eDV 100 M, L		
eDV 112 M	3.1	4.0
eDV 132 S		
eDV 132 M, ML	4.3	6.0
eDV 160 M		
eDV 160 L	6.3	10.0
eDV 180 M, L		

Observe the permitted air and creeping distances when connecting the supply system cable.

5.6.12 Connecting the motor

	NOTE
	It is essential to comply with the valid wiring diagram! Do not connect or start up the motor if this wiring diagram is missing.

The following wiring diagrams can be obtained from SEW-EURODRIVE by specifying the motor order number (Sec. "Type code, nameplate"):

Series	Number of poles	Associated wiring diagram (designation/number) X = placeholder for version
eDR 63	4, 6	DT14 / 08 857 X 03
eDT and eDV	4, 6	DT13 / 08 798 X 06
eDT with brake BC	4	AT101 / 09 861 X 04

Checking cross sections

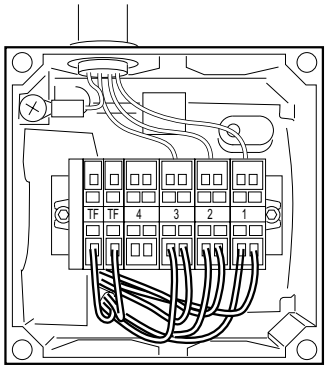
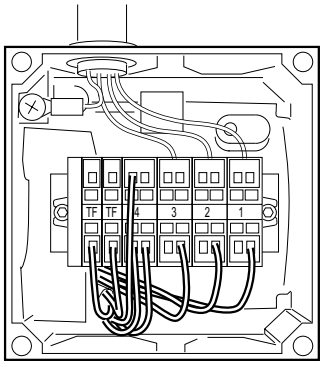
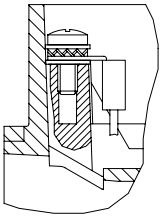
Check the cross sections of the cables based on the rated motor current, the valid installation regulations and the requirements where the unit is installed.

Checking the winding connections

Check the winding connections in the terminal box and tighten them if necessary (→ observe tightening torques).

Motor connection

With motors of size 63, the supply cables must be secured in the spring clamp terminal strip according to the wiring diagram. Connect the protective earth to the protective conductor connection so that the cable lug and housing material are separated by a washer.

△connection	人connection	PE connection
		

TF temperature sensor

	STOP
	Do not apply voltage!

The positive temperature coefficient (PTC) thermistors comply with DIN 44082.

Resistance measurement (measuring instrument with V ≤ 2.5 V or I < 1 mA):

- Standard measured values: 20...500 Ω, thermal resistance > 4000 Ω

When using the temperature sensor for thermal monitoring, the evaluation function must be activated to maintain reliable isolation of the temperature sensor circuit. If the temperature reaches an excessive level, the thermal protection function must be effective immediately.

5.6.13 Connecting the brake

The flameproof brake BC (Ex de) is released electrically. The brake is applied mechanically when the voltage is switched off.

Inspecting the ignition gap

Check the ignition gap of the flameproof brake for damage before establishing the connection

Checking cross sections

The cross sections of the connection cables between the rectifier and the brake must be sufficiently large to guarantee the function of the brake (see Sec. "Operating currents" in "Technical Data").

Connecting the brake

The brake rectifier from SEW-EURODRIVE is installed and connected in the switch cabinet according to the enclosed circuit diagram, outside the potentially explosive atmosphere. Connect the connection cables between the rectifier and the separate brake terminal box on the motor.

5.7 Motors and brake motors of category 3G, 3D and 3GD

5.7.1 General information

The explosion-proof / dust explosion-proof SEW-EURODRIVE motors of the DR 63, DT, DTE, DV and DVE series are designed for the following application zones.

Motor category	Area of application
3G	Application in zone 2 and compliance with the design requirements for equipment group II, category 3G.
3D	Application in zone 22 and compliance with the design requirements for equipment group II, category 3D.
3GD	Application in zone 2 or 22 and compliance with the design requirements for equipment group II, category 3GD.

5.7.2 Enclosure IP54

SEW-EURODRIVE motors in category 3G, 3D and 3GD are supplied with at least enclosure IP54.

5.7.3 Operation at high ambient temperatures

If the nameplate indicates that motors are allowed to be operated up to an ambient temperature of > 50 °C (standard: 40 °C), then it is essential that the cables and cable glands used are suited for temperatures ≥ 90 °C.

5.7.4 Temperature class / surface temperature

The motors are designed for temperature class T3. The maximum surface temperature is 120°C or 140°C.

5.7.5 Protection against impermissibly high surface temperatures

Explosion-proof motors in category 3G, 3D and 3GD ensure safe operation under normal operating conditions. The motor must be switched off securely in the case of overload to avoid the risk of impermissibly high surface temperatures.

The motor can be protected with a motor protection switch or a positive temperature coefficient (PTC) thermistor. For permitted operating modes depending on the motor protection, see Sec. "Permitted operating modes" (page 38) . SEW-EURODRIVE equips brake motors and pole-changing motors in category 3G, 3D and 3GD with positive coefficient thermistors (TF).

5.7.6 Protection exclusively with motor protection switch

Note the following when installing the motor protection switch to EN 60947:

- The motor protection switch must trip immediately in the event of a phase failure.
- The motor protection switch must be set to the rated motor current indicated on the nameplate.
- Pole-changing motors must be protected with mutually interlocked motor protection switches for each pole number.

5.7.7 Protection exclusively with PTC thermistor (TF)

The positive coefficient thermistor must be evaluated using a suitable device. Observe the applicable installation regulations.

5.7.8 Protection with motor protection switch and additional PTC thermistor

The conditions stated for exclusive protection with motor protection switches also apply here. Protection with positive temperature coefficient thermistors (TF) only represents a supplementary protection measure which is irrelevant to certification for potentially explosive conditions.

	NOTE ON EXPLOSION PROTECTION
	Proof of the efficacy of the installed protective equipment is required prior to startup.

5.7.9 Connecting the motor

	NOTE
	It is essential to comply with the valid wiring diagram! Do not connect or start up the motor if this wiring diagram is missing.

The following wiring diagrams can be obtained from SEW-EURODRIVE by specifying the motor order number (see Sec. "Unit designation, nameplate"):

Series	Number of poles	Connection	Associated wiring diagram (designation/number) X = placeholder for version
DR63	4, 6	△ / 人	DT14 / 08 857 X 03
DT, DV, DTE, DVE	4, 6, 8	人 / △	DT13 / 08 798 X 6
	8/4 in Dahlander connection	人 / △ △	DT33 / 08 799 X 6
		人 △ / 人 人	DT53 / 08 739 X 1
	All pole-changing motors with separate windings	人 / 人	DT43 / 08 828 X 7
		△ / 人	DT45 / 08 829 X 7
		人 / △	DT48 / 08 767 X 3

Checking cross sections

Check the cross sections of the cables based on the rated motor current, the valid installation regulations and the requirements where the unit is installed.

Checking the winding connections

Check the winding connections in the terminal box and tighten them if necessary.

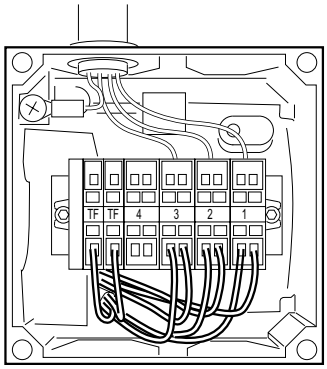
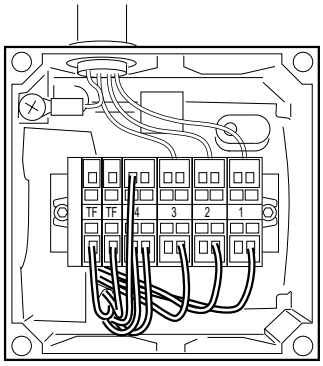
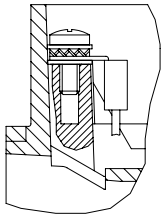
Motor connection

Depending on size and electrical design, the motors are supplied and connected in different ways. Comply with the connection type specified in the following table.

Series	Connection
DR63	Motor connection via tension spring terminal strip
DT, DV, DTE, DVE	Motor connection via terminal board

Motor connection tension spring terminal strip

With motors of size 63, the supply cables must be secured in the spring clamp terminal strip according to the wiring diagram. Connect the protective earth to the protective conductor connection so that the cable lug and housing material are separated by a washer.

△ connection	⅄ connection	PE connection
		

Motor connection terminal board

Terminal stud diameter	Tightening torque of the hex nut	Connection at customer site Cross section	Design	Connection type	Scope of delivery
M4	**1.6 Nm**	≤ **1.5 mm²**	**Type 1a**	**Massive wire Conductor end sleeve**	**Pre-assembled terminal links**
		≤ **6 mm²**	**Type 1b**	**Ring cable lug**	**Pre-assembled terminal links**
		≤ 6 mm²	Type 2	Ring cable lug	Small connection accessories in enclosed bag
M5	2.0 Nm	≤ 10 mm²	Type 2	Ring cable lug	Small connection accessories in enclosed bag
M6	3.0 Nm	≤ 16 mm²	Type 3	Ring cable lug	Small connection accessories in enclosed bag
M8	6.0 Nm	≤ 25 mm²	Type 3	Ring cable lug	Connection accessories preassembled
M10	10.0 Nm	≤ 50 mm²	Type 3	Ring cable lug	Connection accessories preassembled
M12	15.5 Nm	2 x ≤ 50 mm²	Type 3	Ring cable lug	Connection accessories preassembled
M16	30.0 Nm	2 x ≤ 95 mm²	Type 3	Ring cable lug	Connection accessories preassembled

The types printed in bold apply to S1 operation for the standard voltages and standard frequencies according to the data specified in the catalog. Alternative versions can have different connections, e.g. other diameters of the terminal studs, and/or a different scope of delivery.

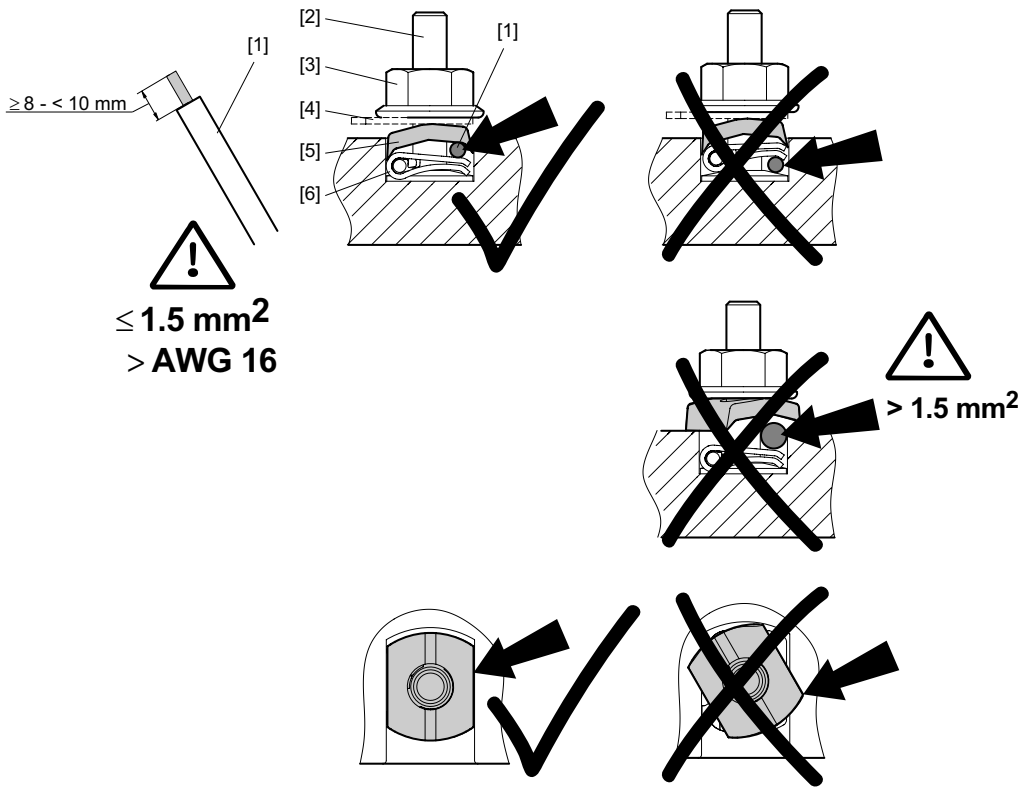
Type 1

a) If the cross section of the external connection is ≤ **1.5 mm²**, it can be installed directly below the terminal washer.

b) If the cross section of the external connection is **> 1.5 mm²**, it must be installed with a cable lug below the terminal washer.

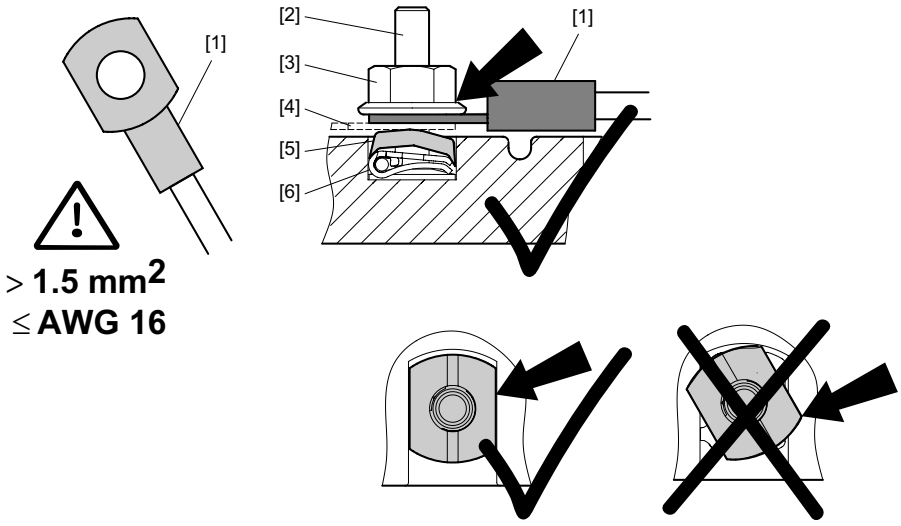
Observe the permitted air and creeping distances for the connection.

Type 1a: Cross section ≤ 1.5 mm²



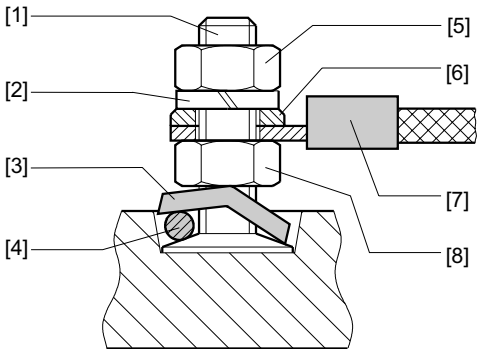
[1] External connection with cross section ≤ 1.5 mm²
[2] Terminal stud
[3] Hexagon nut with flange
[4] Terminal link
[5] Terminal washer
[6] Winding connection with Stocko connection terminal

Type 1b: Cross section > 1.5 mm²



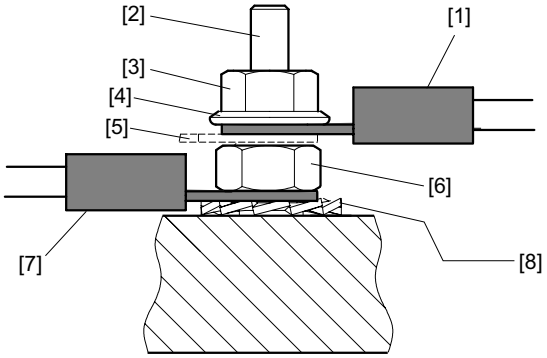
[1] External connection with ring cable lug, for example according to DIN 46237 or DIN 46234
[2] Terminal stud
[3] Hexagon nut with flange
[4] Terminal link
[5] Terminal washer
[6] Winding connection with Stocko connection terminal

Type 2



[1] Terminal stud
[2] Lock washer
[3] Terminal washer
[4] Winding connection
[5] Upper nut
[6] Washer
[7] External connection with ring cable lug, for example according to DIN 46237 or DIN 46234
[8] Lower nut

Type 3



[1] External connection with ring cable lug, for example according to DIN 4637 or DIN 46234
[2] Terminal stud
[3] Upper nut
[4] Washer
[5] Terminal link
[6] Lower nut
[7] Winding connection with ring cable lug
[8] Serrated lock washer

TF temperature sensor

STOP	**STOP**
	Do not apply voltage!

The positive temperature coefficient (PTC) thermistors comply with DIN 44082.

Resistance measurement (measuring instrument with V ≤ 2.5 V or I < 1 mA):

- Standard measured values: 20...500 Ω, thermal resistance > 4000 Ω

When using the temperature sensor for thermal monitoring, the evaluation function must be activated to maintain reliable isolation of the temperature sensor circuit. If the temperature reaches an excessive level, the thermal protection function must be effective immediately.

5.7.10 Connecting the brake

The BMG/BM brake is released electrically. The brake is applied mechanically when the voltage is switched off.

Note the limit values for permitted work done

⚠ DANGER!

Risk of explosion if the maximum permitted braking work per braking operation is exceeded.

Severe or fatal injuries.

- The maximum braking work per braking operation must not be exceeded, not even in the case of emergency braking operations.
- The limit values of the permitted braking work (see sec. "Permitted work done by the brake" (page 92)) must always be observed.
- The machine designer is responsible for ensuring that the machine dimensions are selected correctly on the basis of the SEW-EURODRIVE project planning regulations and the brake data in "Drive Engineering - Practical Implementation, Vol. 4".

Checking the function of the brake

Check that the brake is functioning correctly prior to startup to make sure the brake linings are not rubbing,as this would lead to overheating.

Checking cross sections

The cross sections of the connection cables between the power system, the rectifier and the brake must be sufficiently large to guarantee the function of the brake (see Sec. "Operating currents" in "Technical Data").

Connecting the brake rectifier

Depending on its design and function, the SEW-EURODRIVE brake rectifier or brake control system is installed and connected according to the enclosed circuit diagram. For category 3G and 3GD, the brake rectifier or brake control system has to be installed in the control cabinet outside the potentially explosive area. For category 3D, installation is permitted in the control cabinet outside the potentially explosive area or in the terminal box of the motor.

5.7.11 Connecting VE forced cooling fan

Category II3D motors can be equipped with a forced cooling fan as an option. For notes on connection and safe operation, refer to the operating instructions of the VE forced cooling fan.

5.8 Category 3D asynchronous servomotors

5.8.1 General information

The explosion-proof / dust explosion-proof SEW-EURODRIVE motors of the CT and CV series are designed for the following application zones.

Motor category	Area of application
3D	Application in zone 22 and compliance with the design requirements for equipment group II, category 3D.

5.8.2 Enclosure IP54

SEW-EURODRIVE motors in category II3D are supplied with at least enclosure IP54.

5.8.3 Operation at high ambient temperatures

If the nameplate indicates that motors are allowed to be operated up to an ambient temperature of > 50 °C (standard: 40 °C), then it is essential that the cables and cable entries used are suited for temperatures ≥ 90 °C.

5.8.4 Temperature class / surface temperature

The maximum surface temperature is 120°C or 140°C, depending on the type.

5.8.5 Speed classes

The motors are designed in the speed classes 1200 min^{-1}, 1700 min^{-1}, 2100 min^{-1} and 3000 min^{-1} (see sec. "Operating Modes and Limit Values")

5.8.6 Impermissible high surface temperatures

Explosion-proof motors in category II3D ensure safe operation under normal operating conditions. The motor must be switched off securely in the case of overload to avoid the risk of impermissibly high temperatures.

5.8.7 Protection against excessive temperature

To ensure that the permitted limit temperature is not exceeded, explosion-proof asynchronous servomotors in the CT and CV series are always equipped with a positive temperature coefficient thermistor (TF). When installing the positive temperature coefficient, it is important that the sensor is evaluated by a device approved for this purpose so it complies with the 94/9/EC directive. The positive coefficient thermistor must be evaluated using a suitable device. Observe the applicable installation regulations.

5.8.8 Connecting the motor

	NOTE
	It is essential to comply with the valid wiring diagram! Do not connect or start up the motor if this wiring diagram is missing.

The following wiring diagrams can be obtained from SEW-EURODRIVE by specifying the motor order number (see Sec. "Unit designation, nameplate"):

Series	Number of poles	Connection	Associated wiring diagram (designation/number) X = placeholder for version
CT, CV	4	△ / 人	DT13 / 08 798 X 6

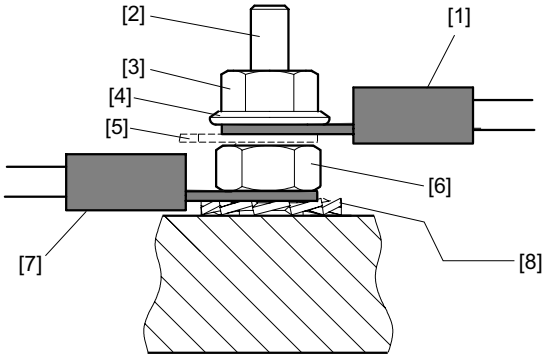
Checking cross sections

Check the cross sections of the cables based on the rated motor current, the valid installation regulations and the requirements where the unit is installed.

Checking the winding connections

Check the winding connections in the terminal box and tighten them if necessary.

Motor connection



[1] External connection with ring cable lug, for example according to DIN 4637 or DIN 46234
[2] Terminal stud
[3] Upper nut
[4] Washer
[5] Terminal link
[6] Lower nut
[7] Winding connection with ring cable lug
[8] Serrated lock washer

Tightening torques

Arrange the cables and terminal links as shown in the wiring diagram and screw them on firmly. Observe the tightening torques specified in the following table.

Diameter of the terminal studs	Tightening torque of the hex nut [Nm]
M4	1.6
M5	2
M6	3
M8	6
M10	10
M12	15.5
M16	30

TF temperature sensor

STOP	**STOP**
	Do not apply voltage!

The positive temperature coefficient (PTC) thermistors comply with DIN 44082.

Resistance measurement (measuring instrument with V ≤ 2.5 V or I < 1 mA):

- Standard measured values: 20...500 Ω, thermal resistance > 4000 Ω

When using the temperature sensor for thermal monitoring, the evaluation function must be activated to maintain reliable isolation of the temperature sensor circuit. If the temperature reaches an excessive level, the thermal protection function must be effective immediately.

5.8.9 Connecting the brake

The BMG/BM brake is released electrically. The brake is applied mechanically when the voltage is switched off.

Note the limit values for permitted work done

⚠ DANGER!

Risk of explosion if the maximum permitted braking work per braking operation is exceeded.

Severe or fatal injuries.

- The maximum braking work per braking operation must not be exceeded, not even in the case of emergency braking operations.
- The limit values of the permitted braking work (see sec. "Permitted work done by the brake" (page 92)) must always be observed.
- The machine designer is responsible for ensuring that the machine dimensions are selected correctly on the basis of the SEW-EURODRIVE project planning regulations and the brake data in "Drive Engineering - Practical Implementation, Vol. 4".

Checking the function of the brake

Check that the brake is functioning correctly prior to startup to make sure the brake linings are not rubbing,as this would lead to overheating.

Checking cross sections

The cross sections of the connection cables between the power system, the rectifier and the brake must be sufficiently large to guarantee the function of the brake (see Sec. "Operating currents" in "Technical Data").

Connecting the brake rectifier

Depending on its design and function, the SEW-EURODRIVE brake rectifier or brake control system is

- connected in the terminal box of the motor
- or in the switch cabinet outside the potentially explosive atmosphere.

. In either case, connect the connect cables between the voltage supply, rectifier and brake connections according to the wiring diagram.

5.8.10 Connecting VE forced cooling fan

Category II3D motors can be equipped with a forced cooling fan as an option. For notes on connection and safe operation, refer to the operating instructions of the VE forced cooling fan.

6 Operating Modes and Limit Values

6.1 Permitted operating modes

Motor type and unit category	Protection against impermissibly high temperatures exclusively by	Permitted operating mode
eDT../eDV.. II2G	Protective circuit breaker	• S1 • Heavy starting not possible[1)]
eDT..BC.. II2G	PTC thermistor (TF)	• S1 • S4 / no-load starting frequency according to catalog data / starting frequency is to be calculated under load • Frequency inverter operation according to specifications • Heavy start[1)]
eDT../eDV.. II2D	Motor protection switch and positive coefficient temperature thermistor (TF)	• S1 • No heavy start • Frequency inverter operation according to specifications
DR/DT/DV II3GD/II3D	Protective circuit breaker	• S1 • No heavy start[1)]
DR/DT/DV DT..BM../DV..BM.. II3GD/II3D	PTC thermistor (TF)	• S1 • S4 / no-load starting frequency according to catalog data / starting frequency is to be calculated under load • Heavy start • Frequency inverter operation according to specifications • Soft-start units

1) Heavy starting is present when a motor protection switch that was properly selected and set for normal operating conditions trips during the acceleration time. This is usually the case when the acceleration time is > 1.7 x t_E time.

6.2 Frequency inverter operation in category 2G

6.2.1 Using category 2G motors

NOTES ON EXPLOSION PROTECTION

The following applies

- The frequency inverter can only be operated with motors that are permitted for this operating mode according to the EC prototype test certificate.
- It is not permitted to connect more than one of the described motors to one frequency inverter.
- The voltage at the motor terminal board must projected be to prevent overheating.
- For startup, ensure that the motor voltage complies with the specifications of the EC prototype test certificate.
- If the motor voltage is too low (undercompensation), slip increases, which causes higher temperatures in the rotor of the motor.
- If the motor voltage is too high (overcompensation), the stator current is very high and the winding temperature rises more sharply.
- If the mechanical load is the same, operation on a frequency inverter causes a more significant motor temperature rise due to the harmonic content in current and voltage.

6.2.2 Conditions for safe operation

General

Install the frequency inverter outside the potentially explosive atmosphere.

Motor/frequency inverter combination

Inverters have to fulfill the following conditions for powering explosion-proof motors:

- Control mode: constant machine flow
- Rated output current of the frequency inverter ≤ twice the rated motor current
- Switching frequency > 3 kHz

Thermal motor protection

Thermal motor protection is ensured by the following measures:

- Winding temperature monitoring through PTC thermistors (TF) built into the winding. The TF is monitored via an evaluation unit that complies with directive 94/9 and is labeled with Ex identification II(2)G.
- Motor current monitoring according to the specifications of the EC prototype test certificate.
- Motor torque limitation according to the specifications of the EC prototype test certificate.

Overvoltage at the motor terminals

The overvoltage at the motor terminals must be limited to < 1700 V. To do so, limit the input voltage at the frequency inverter to 500V.

If the drive is operated regeneratively quite often due to the application (e.g. hoist applications), you must use output filters (sine filters) to prevent dangerous overvoltages at the motor terminals.

If a reliable calculation of the voltage at the motor terminals is not possible, the voltage peaks have to measured with suitable equipment after startup, using the rated load of the drive, if possible.

Gear units

From the perspective of the gear unit, restrictions apply to the maximum input speed when using controlled gearmotors. For input speeds above 1500 min^{-1} please contact SEW-EURODRIVE.

6.2.3 Calculating the motor voltage

For inverter operation, the motor voltage is calculated as follows:

$$U_{motor} = U_{mains} - (\Delta U_{inp.filter\ /\ choke} + \Delta U_{FI} + \Delta U_{outp.filter} + \Delta U_{cable})$$

$U_{Power\ supply}$

The mains voltage is measured directly with a multimeter or alternatively by reading the DC link voltage (U_{VZ}) in the inverter ($U_{mains} = U_{VZ}/1{,}35$).

$\Delta\ U_{input\ filter}$

The voltage drop across the input filter depends on the design of the filter. For more detailed information, please refer to the documentation of the respective line filter.

$\Delta\ U_{input\ choke}$

For optional SEW input chokes (ND...), the voltage drop can be calculated as follows.

$$\Delta U_{inp.choke} = I \times \sqrt{3} \times \sqrt{(2 \times \pi \times f \times L)^2 + R^2}$$

Since the resistance R is small enough to be neglected compared to the inductance L, the equation can be simplified to:

$$\Delta U_{inp.choke} = I \times \sqrt{3} \times 2 \times \pi \times f \times L$$

For the value of the inductance L, refer to the documentation of the the line choke.

$\Delta\ U_{output\ filter}$

The voltage drop at the output filter is in proportion to the modulated output basic frequency and to the motor current. In individual cases it might be necessary to ask the manufacturer of the output filter about it. The voltage drop of SEW output filters can be found in the table "Voltage drop across SEW output filters" (see Sec. "Parameter setting: Frequency inverters for category 2G").

$$\Delta U_{outp.filter} = I \times \sqrt{3} \times \sqrt{(2 \times \pi \times f \times L)^2 + R^2}$$

Since the resistance R is small enough to be neglected compared to the inductance L, the equation can be simplified to:

$$\Delta U_{outp.filter} = I \times \sqrt{3} \times 2 \times \pi \times f \times L$$

$\Delta\ U_{Cable}$

The voltage drop of the motor cable depends on the motor current and the cross section, length and material of the cable. The voltage drop can be found in the table "Voltage drop at the motor cable" (see Sec. "Parameter setting: Frequency inverters for category 2G").

U_{FI} The voltage drop at the inverter is determined by:

- the voltages across the rectifier path
- the voltages at the output stage transistors
- the transformation principle from mains to DC link voltage and then to three-phase voltage
- the anti-overlap times resulting from the clocking of the output stage and the missing voltage-time areas
- the modulation process
- the load state and the energy dissipation of the DC link capacitors

To simplify the calculation, use the value of 7.5% of the supply input voltage. This value is to be taken as the maximum possible voltage drop at the inverter. This ensures a reliable configuration.

$f_{break, motor}$ Breakpoint of the motor

$f_{break, FI}$ Breakpoint frequency, set at the frequency inverter

$U_{break, FI}$ Voltage at breakpoint $f_{break, FI}$, set at the frequency inverter

$\Sigma U_{deviation}$ $\sum U_{deviation} = (U_{FI} + \Delta U_{outp.filter} + \Delta U_{cable} + \Delta U_{inp.filter\ /\ choke})$

U_{Break} Rated voltage of the motor

	NOTE
	The voltage drop across the output filter has to be compensated by the slope of the V/f characteristic curve (breakpoint). The voltage drop at the cable is compensated by the IxR compensation. SEW frequency inverters adjust this value in the "Automatic calibration ON" mode every time the frequency inverter is started.

6.2.4 Determining the motor breakpoint

To avoid undercompensation, the motor breakpoint has to be projected so that the voltage drop (see Sec. "Determining the voltage drop") between mains and motor is taken into account.

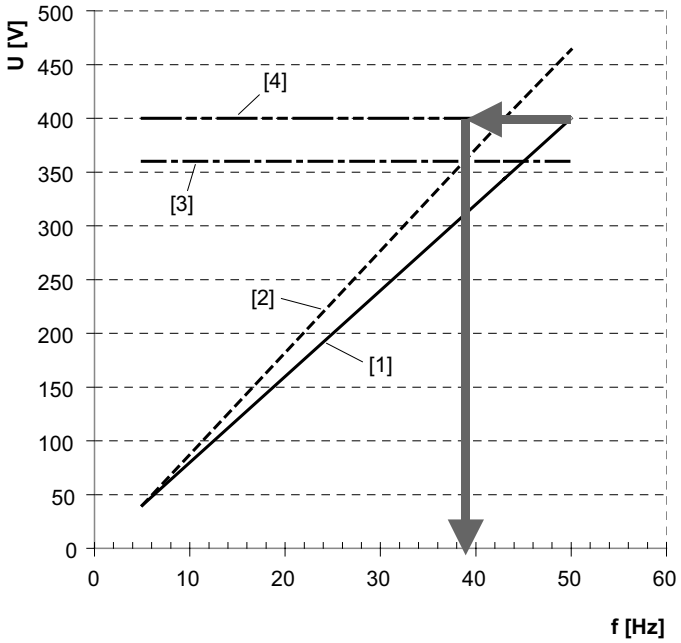
There are 3 ways to ensure this:

- Terminal voltage at breakpoint < Rated voltage of the motor
- Terminal voltage at breakpoint can be set to the rated voltage of the motor.
- Motor voltage selection

6.2.5 Terminal voltage at breakpoint < Rated voltage of the motor

Determining the motor breakpoint

The base frequency is set to a lower value at the frequency inverter during startup. Note that the available speed range is now limited. In this example, the field weakening range (undercompensation) begins below 50 Hz already.



[1] V/f characteristic curve (motor characteristic curve)
[2] V/f corrected (set characteristic curve)
[3] Rated motor voltage
[4] Mains voltage

To set the breakpoint at the frequency inverter in this example, set 400V and the frequency calculated according to formula

$$f_{type,FI} = \frac{f_{type,motor}}{U_{type} + \sum U_{deviation}} \times U_{mains}$$

.

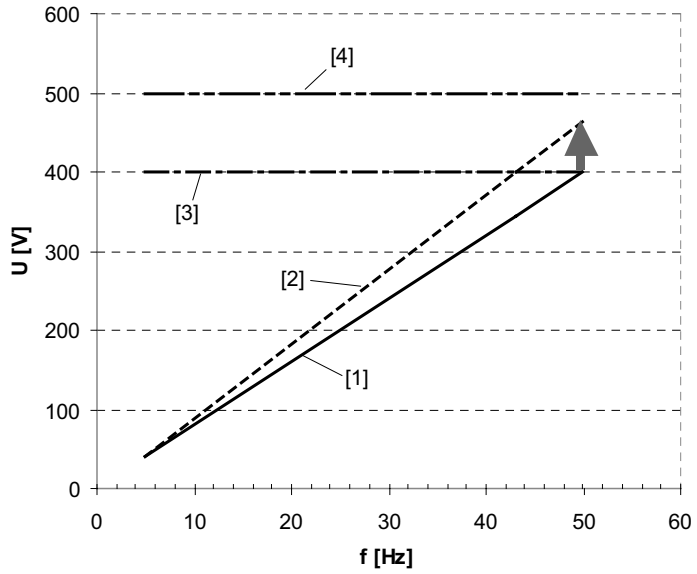
6.2.6 Terminal voltage at breakpoint can be set to the rated voltage of the motor.

Determining the motor breakpoint

On the V/f characteristic curve of the motor, the motor breakpoint is raised by the calculated voltage drop ΔU.

For this kind of projecting, the entire speed range of the motor can be used. As a cross-check, the input voltage of the frequency inverter has to fulfill the following requirements:

$$U_{mains} \geq U_{motor} + (U_{FI} + \Delta U_{outp.filter} + \Delta U_{cable} + \Delta U_{inp.filter\ /\ choke})$$



[1] V/f characteristic curve (motor characteristic curve)
[2] V/f corrected (set characteristic curve)
[3] Rated motor voltage
[4] Mains voltage

To set the breakpoint, set 464 V and 50 Hz at the frequency inverter in this example.

If the mains voltage is below the calculated value of (U_{break} + $\Delta U_{deviation}$), enter the value calculated according to the formula

$$f_{type,FI} = \frac{f_{type,motor}}{U_{type} + \sum U_{deviation}} \times U_{mains}$$

for mains voltage and frequency.

6.2.7 Motor voltage selection

Determining the motor breakpoint

Select a motor (winding) with a rated voltage that corresponds exactly to the calculated voltage at the motor terminal board. Note that the modified motor winding requires a proportionally higher current.

$$f_{type,\,FI} = \frac{f_{type,\,motor}}{U_{type} + \sum U_{deviation}} \times U_{mains}$$

The following values are set at the inverter:

$$f_{type,\,FI} = f_{type,\,motor}$$

$$U_{type,\,FI} = U_{type} + \sum U_{deviation}$$

	NOTES
	The maximum frequency may not exceed the value of $f_{break,\,motor}$.

6.3 Frequency inverter operation in categories 3G, 3D and 3GD

6.3.1 Using motors in category II3GD

	NOTE ON EXPLOSION PROTECTION
	The following applies • Use as category II3G unit in zone 2: The same conditions and restrictions apply as to category II3D motors. • Use as category II3D unit in zone 22: The same conditions and restrictions apply as to category II3G motors • Use as category II3GD unit in both zone 2 and zone 22: In this case, the more stringent conditions and restrictions apply (see details on II3G and II3D).

6.3.2 Conditions for safe operation

General

Install the frequency inverter outside the potentially explosive atmosphere.

Motor/frequency inverter combination

- The listed motor/frequency inverter combinations are recommended for category II3G motors. Frequency inverters that have similar values with respect to output current and output voltage (EN60079-15) can also be used.
- The listed motor/frequency inverter combinations are recommended for category II3D motors. If you want to operate category II3D motors on other frequency inverters, the maximum speeds/frequencies and the thermal torque limiting characteristic curves must also be observed. In addition, we strongly recommend you use a frequency inverter matching the respective power rating.

Temperature class and maximum surface temperature

- Motors in category II3G are in the temperature class T3.
- The maximum surface temperature of II3D motors is 120°C or 140°C.
- II3GD motors are in temperature class T3 and have a maximum surface temperature of 120°C or 140°C.

Protection against excessive temperature

Only motors that are equipped with a positive temperature coefficient thermistor (TF) are permitted for operation on a frequency inverter to ensure that the permitted limit temperature is not exceeded. The positive temperature coefficient thermistor has to be evaluated using an appropriate device.

Supply voltage of the frequency inverter

The supply voltage of the frequency inverter must not fall below the value of 400 V.

Overvoltage at the motor terminals

The overvoltage at the motor terminals must be limited to < 1700 V. To do so, limit the input voltage at the frequency inverter to 500V.

If the drive is operated regeneratively quite often due to the application (e.g. hoist applications), you must use output filters (sine filters) to prevent dangerous overvoltages at the motor terminals.

If a reliable calculation of the voltage at the motor terminals is not possible, the voltage peaks have to measured with suitable equipment after startup, using the rated load of the drive, if possible.

EMC measures

The following components are permitted for the MOVIDRIVE® frequency inverters:

- Line filters of the NF...-... series
- Output chokes of the HD... series
- Output filter (sine filter) HF..

  If an output filter is used, the voltage drop has to be compensated via the filter. Observe Sec. "Calculating the motor voltage" (page 40).

	NOTE ON EXPLOSION PROTECTION
	If using a different type of frequency inverter, you must ensure that the output connection of the frequency inverter to improve the EMC characteristics does not significantly reduce the terminal voltage at the motor (≤ 5 %).

Maximum permitted torques

Motors operated with a frequency inverter must not exceed the maximum torques specified in this section. The values may be exceeded for brief periods if the effective operating point lies below the characteristic curve.

Maximum permitted speeds/frequencies

It is essential to observe the maximum speeds frequencies listed in the assignment tables for the motor/frequency inverter combinations. These values must not be exceeded.

Group drives

Group drive means that several motors are connected to one frequency inverter output.

	NOTE ON EXPLOSION PROTECTION
	Motors of the DR/DT/DV/DTE/DVE series in category II3G or II3GD for use in zone 2 may generally not be operated as group drive!

The following restrictions apply to motors of the DR/DT/DV/DTE/DVE series in category II3D for use in zone 22:

- The line lengths specified by the frequency inverter manufacturer must not be exceeded.
- The motors in a group must not be more than two power ratings apart.
- Each motor has to be monitored.

Gear units

From the perspective of the gear unit, restrictions apply to the maximum speed when using controlled gearmotors. For input speeds above 1500 min^{-1} please contact SEW-EURODRIVE.

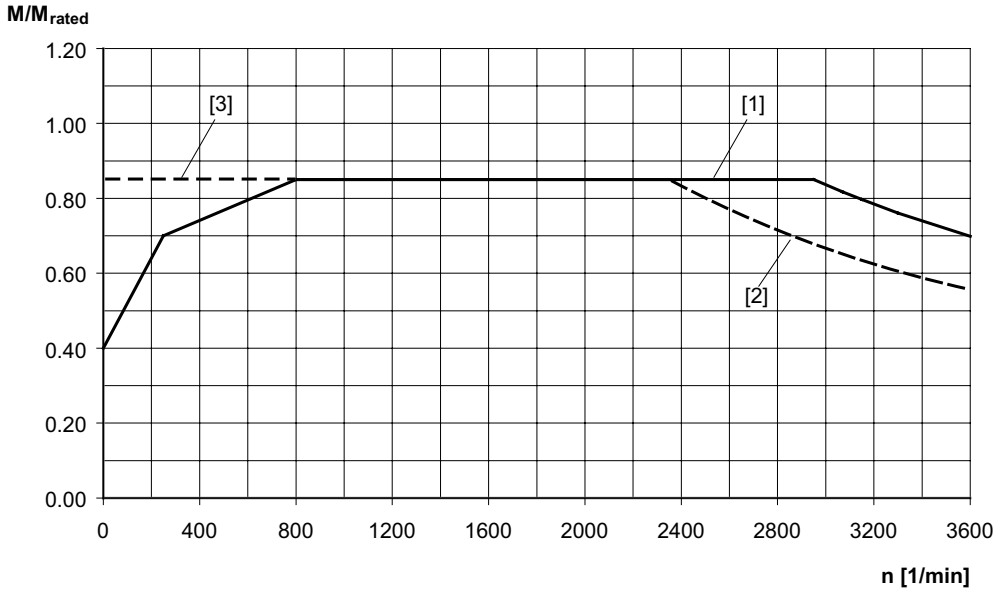
6.4 Motor / inverter assignment: MOVIDRIVE® and MOVITRAC®

Motor	Maximum permitted output power of MOVIDRIVE® and MOVITRAC®			
	⅄	n_{Max} [min^{-1}]	△	n_{Max} [min^{-1}]
DR 63 S 4	0.25 kW	2100	0.25 kW	3600
DR 63 M 4	0.25 kW	2100	0.37 kW	3600
DR 63 L 4	0.25 kW	2100	0.55 kW	3600
DT 71 K 4	0.25 kW	2100	0.25 kW	3600
DT 71 C 4	0.25 kW	2100	0.37 kW	3600
DT 71 D 4	0.37 kW	2100	0.55 kW	3600
DT 80 K 4	0.55 kW	2100	0.75 kW	3600
DT 80 N 4	0.75 kW	2100	1.1 kW	3600
DT 90 S 4	1.1 kW	2100	1.5 kW	3600
DT 90 L 4	1.5 kW	2100	2.2 kW	3600
DV 100 M 4	2.2 kW	2100	3.0 kW	3600
DV 100 L 4	3.0 kW	2100	4.0 kW	3600
DV 112 M 4	4.0 kW	2100	5.5 kW	3600
DV 132 S 4	5.5 kW	2100	7.5 kW	3600
DV 132 M 4	7.5 kW	2100	9.2 kW	3600
DV 132 ML4	9.2 kW	2100	11 kW	3600
DV 160 M 4	11 kW	2100	15 kW	3600
DV 160 L 4	15 kW	2100	22 kW	3600
DV 180 M 4	22 kW	2100	22 kW	2700
DV 180 L 4	22 kW	2100	37 kW	2700
DV 200 L 4	37 kW	2100	37 kW	2700
DV 225 S 4	37 kW	2100	55 kW	2700
DV 225 M 4	55 kW	2100	55 kW	2700
DVE 250 M 4	55 kW	2100	75 kW	2500
DVE 280 S 4	75 kW	2100	132 kW	2500
DTE 90 K4	0.75 kW	2100	1.1 kW	3000
DTE 90 C4	0.75 kW	2100	1.1 kW	3000
DTE 90 S4	1.1 kW	2100	1.1 kW	3000
DTE 90 L4	1.5 kW	2100	2.2 kW	3000
DVE 100 M4	2.2 kW	2100	4.0 kW	3000
DVE 100 L4	3.0 kW	2100	5.5 kW	3000
DVE 112 M4	4.0 kW	1800	7.5 kW	2400
DVE 132 S4	5.5 kW	1800	11 kW	2000
DVE 132 M4	7.5 kW	1800	11 kW	2000
DVE 160 M4	11 kW	1800	22 kW	2000
DVE 160 L4	15 kW	1800	22 kW	2400
DVE 180 M4	22 kW	1800	37 kW	2400
DVE 180 L4	22 kW	1800	37 kW	2500
DVE 200 L4	37 kW	1800	55 kW	2500
DVE 225 S4	37 kW	1800	55 kW	2500
DVE 250 M4	55 kW	2100	90 kW	2500
DVE 280 S4	75 kW	2100	132 kW	2500

6.5 Asynchronous motors: Thermal limit characteristic curves

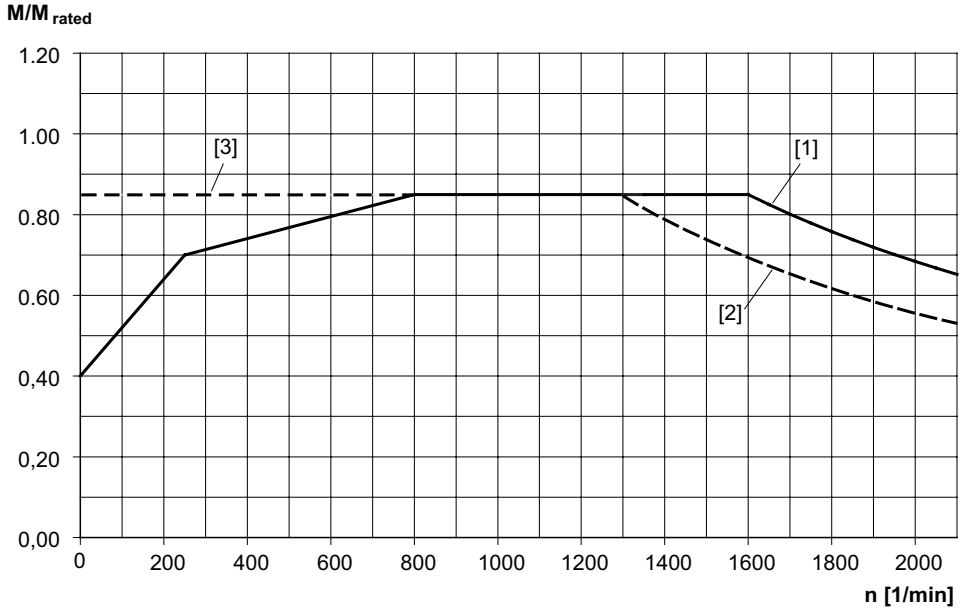
6.5.1 Thermal torque limit characteristic curves

Thermal torque limit characteristic curve in inverter operation for 4-pole AC motors and AC brake motors in △ connection:



[1] 104 Hz limit characteristic curve
[2] 87 Hz limit characteristic curve
[3] with VE forced cooling fan

Thermal torque limit characteristic curve in inverter operation for 4-pole AC motors and AC brake motors in ⅄ connection:



[1] 60 Hz limit characteristic curve
[2] 50 Hz limit characteristic curve
[3] with VE forced cooling fan

6.6 Asynchronous servomotors: Limits for current and torque

	NOTE ON EXPLOSION PROTECTION
	The values specified in the table for maximum current, torque and speed must not be exceeded during operation.

6.6.1 Speed class 1200 min^{-1}

Motor type	M_N [Nm]	M_{max} [Nm]	n_{max} [min^{-1}]	I_N [A]	I_{max} [A]
CT71D4.../II3D	2.1	6	3500	1.1	2.7
CT80N4.../II3D	4.3	13		1.9	4.4
CT90L4.../II3D	8.5	26		3.3	8.2
CV100M4.../II3D	13	38		4.2	10.9
CV100L4.../II3D	22	66		7.5	20.4
CV132S4.../II3D	31	94		10.1	26.9
CV132M4.../II3D	43	128		10.7	26.9
CV132ML4.../II3D	52	156		16.0	43.2
CV160M4.../II3D	62	186		19.8	52.7
CV160L4.../II3D	81	242		26.7	69.6
CV180M4.../II3D	94	281	2500	32.3	79.2
CV180L4.../II3D	106	319		35.3	88.7
CV200L4.../II3D	170	510		51.0	137.5

6.6.2 Speed class 1700 min^{-1}

Motor type	M_N [Nm]	M_{max} [Nm]	n_{max} [min^{-1}]	I_N [A]	I_{max} [A]
CT71D4.../II3D	2.0	6	3500	1.5	3.7
CT80N4.../II3D	4.3	13		2.6	6.1
CT90L4.../II3D	8.5	26		4.5	11.3
CV100M4/...II3D	13	38		5.8	14.9
CV100L4.../II3D	22	66		10.2	28.0
CV132S4.../II3D	31	94		13.9	37.1
CV132M4.../II3D	41	122		18.5	49.6
CV132ML4.../II3D	49	148		23.1	61.6
CV160M4.../II3D	60	181		26.8	70.7
CV160L4.../II3D	76	227		35.2	90.1
CV180M4.../II3D	89	268	2500	43.3	104.5
CV180L4.../II3D	98	293		50.2	123.0
CV200L4..../II3D	162	485		68.9	183.9

6.6.3 Speed class 2100 min^{-1}

Motor type	M_N [Nm]	M_{max} [Nm]	n_{max} [min^{-1}]	I_N [A]	I_{max} [A]
CT71D4.../II3D	2.1	6	3500	1.9	4.6
CT80N4.../II3D	4.3	13		3.3	7.6
CT90L4..../II3D	8.5	26		5.7	14.1
CV100M4.../II3D	13	38		7.3	18.8
CV100L4.../II3D	21	64		12.5	34.0
CV132S4.../II3D	31	94		17.4	46.6
CV132M4.../II3D	41	122		18.1	44.9
CV132ML4.../II3D	49	148		26.7	71.3
CV160M4.../II3D	60	179		33.3	87.6
CV160L4.../II3D	75	224		43.9	112.1
CV180M4.../II3D	85	255	2500	52.8	125.6
CV180L4.../II3D	98	293		57.9	141.9
CV200L4.../II3D	149	446		79.8	209.4

6.6.4 Speed class 3000 min^{-1}

Motor type	M_N [Nm]	M_{max} [Nm]	n_{max} [min^{-1}]	I_N [A]	I_{max} [A]
CT71D4.../II3D	2.0	6	3500	2.6	6.1
CT80N4.../II3D	3.8	11		4.3	9.6
CT90L4.../II3D	8.1	24		7.5	18.6
CV100M4.../II3D	13	38		10.0	25.9
CV100L4.../II3D	18	54		15.0	39.5
CV132S4.../II3D	30	89		23.0	60.9
CV132M4.../II3D	38	115		30.4	80.8
CV132ML4.../II3D	44	133		36.9	96.1
CV160M4.../II3D	54	163		43.0	110.9
CV160L4.../II3D	72	217		59.1	149.3
CV180M4.../II3D	79	237	2500	69.9	161.8
CV180L4.../II3D	94	281		84.6	204.4
CV200L4.../II3D	123	370		98.5	246.0

6.7 Asynchronous servomotors: Thermal limit characteristic curves

6.7.1 Note the speed class

During project planning, note that the characteristic curves are different for each speed class.

6.7.2 Operating mode

The characteristic curves show the permitted torque ratings in continuous duty S1. Determine the effective operating point for different operating modes.

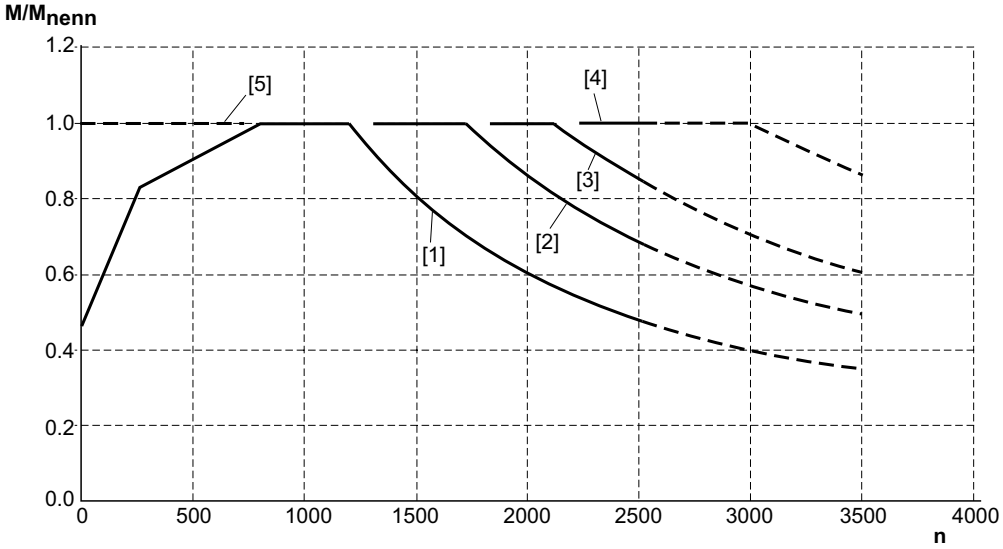


Figure 5: Thermal torque limit characteristic curves

[1] Speed class 1200 1/min
[2] Speed class 1700 1/min
[3] Speed class 2100 1/min
[4] Speed class 3000 1/min
[5] with VE forced cooling fan

6.8 Asynchronous servomotors: Frequency inverter assignment

6.8.1 General

Install the frequency inverter outside the potentially explosive atmosphere.

6.8.2 Permitted frequency inverters

The highest dynamic properties and control quality is achieved by using frequency inverters from the MOVIDRIVE series®. The frequency inverters listed in table "CT/CV.../II3D - MOVIDRIVE®" combinations" are then mandatory.

The use of other types of frequency inverters is permitted. Make sure that the permitted operating data of the motors (see Sec. "Asynchronous servomotors: Limits for current and torque" (page 50)) is not exceeded.

6.8.3 Permitted operating modes for MOVIDRIVE frequency inverters

To ensure highest dynamic properties, frequency inverters of the MOVIDRIVE® series must be started up in a CFC operating mode. VFC operating modes are also permitted.

6.8.4 Supply voltage of the frequency inverter

The supply voltage of the frequency inverter must not fall below the minimum value of 400 V.

The maximum permitted supply voltage must be limited to 500 V. Otherwise, the frequency inverter currents can cause dangerous overvoltages to build up at the motor connection terminals.

6.8.5 EMC measures

The following components are permitted for the MOVIDRIVE® frequency inverters:

- Line filters of the NF...-... series
- Output chokes of the HD... series

	NOTE ON EXPLOSION PROTECTION
Ex	If using a different type of frequency inverter, you must ensure that the output connection of the frequency inverter to improve the EMC characteristics does not significantly reduce the terminal voltage at the motor (≤ 5 %).

6.8.6 CT/CV.../II3D - MOVIDRIVE combinations

Recommended combination

The table lists the recommended motor/MOVIDRIVE® combinations depending on the speed class. Other combinations should not be used because this could cause an overload in the motors.

	NOTE ON EXPLOSION PROTECTION
	The values specified in the table for maximum current and maximum speed must not be exceeded during operation!

Speed class 1200 min^{-1}

Motor type	M_N [Nm]	M_{max} [Nm]	n_{max} [min^{-1}]	M_{max} n_{base} [Nm] [Hz]	MOVIDRIVE® 0015	0022	0030	0040	0055	0075	0110
CT71D4 / II3D	2.1	6	3500	M_{max}	7.5						
				n_{base}	600						
CT80N4 / II3D	4.3	13		M_{max}	13.0						
				n_{base}	540						
CT90L4 /II3D	8.5	26		M_{max}	18.2	25.7					
				n_{base}	928	781					
CV100M4 / II3D	13	38		M_{max}		29.0	37.0				
				n_{base}		883	781				
CV100L4 / II3D	22	66		M_{max}			32.6	45.3	60		
				n_{base}			1062	947	813		
CV132S4 / II3D	31	94		M_{max}					64	84	
				n_{base}					992	915	
CV132M4 / II3D	43	128		M_{max}						82	125
				n_{base}						1011	877

Motor type	M_N [Nm]	M_{max} [Nm]	n_{max} [min^{-1}]	M_{max} n_{base} [Nm] [Hz]	MOVIDRIVE® 0110	0150	0220	0300	0370	0450	0550	0750
CV132ML4 / II3D	52	156	3500	M_{max}	126	156						
				n_{base}	922	819						
CV160M4 / II3D	62	186		M_{max}	125	169						
				n_{base}	986	909						
CV160L4 / II3D	81	242		M_{max}		163	240					
				n_{base}		1043	954					
CV180M4 / II3D	94	281	2500	M_{max}			241	282				
				n_{base}			1050	986				
CV180L4 / II3D	106	319		M_{max}			231	308				
				n_{base}			1018	973				
CV200L4 / II3D	170	510		M_{max}				326	402	494	510	
				n_{base}				1011	986	947	940	

Speed class 1700 min^{-1}

Motor type	M_N [Nm]	M_{max} [Nm]	n_{max} [min^{-1}]	M_{max} n_{base} [Nm] [Hz]	MOVIDRIVE® 0015	0022	0030	0040	0055	0075	0110
CT71D4 / II3D	2.1	6	3500	M_{max}	6.0						
				n_{base}	1250						
CT80N4 / II3D	4.3	13		M_{max}	12.6						
				n_{base}	1150						
CT90L4 / II3D	8.5	26		M_{max}		18.0	23.5				
				n_{base}		1400	1280				
CV100M4 / II3D	13	38		M_{max}			25.7	36.0			
				n_{base}			1402	1274			
CV100L4 / II3D	22	66		M_{max}				32.9	44.2	57	
				n_{base}				1510	1402	1274	
CV132S4 / II3D	31	94		M_{max}						59	91
				n_{base}						1470	1330

Motor type	M_N [Nm]	M_{max} [Nm]	n_{max} [min^{-1}]	M_{max} n_{base} [Nm] [Hz]	MOVIDRIVE® 0110	0150	0220	0300	0370	0450	0550	0750
CV132M4 / II3D	41	122	3500	M_{max}	89	121						
				n_{base}	1440	1330						
CV132ML4 / II3D	49	148		M_{max}	83	114	148					
				n_{base}	1562	1485	1331					
CV160M4 / II3D	60	181		M_{max}		120	176					
				n_{base}		1420	1310					
CV160L4 / II3D	76	227		M_{max}			170	226				
				n_{base}			1470	1400				
CV180M4 / II3D	89	268	2500	M_{max}			168	226	268			
				n_{base}			1550	1510	1460			
CV180L4 / II3D	98	293		M_{max}				217	269			
				n_{base}				1450	1420			
CV200L4 / II3D	162	485		M_{max}						353	420	485
				n_{base}						1421	1395	1344

Speed class 2100 min^{-1}

Motor type	M_N [Nm]	M_{max} [Nm]	n_{max} [min^{-1}]	M_{max} n_{base} [Nm] [Hz]	MOVIDRIVE® 0015	0022	0030	0040	0055	0075	0110
CT71D4 / II3D	2.1	6	3500	M_{max}	6.0						
				n_{base}	1280						
CT80N4 / II3D	4.3	13		M_{max}	9.7	13.0					
				n_{base}	1754	1510					
CT90L4 / II3D	8.5	26		M_{max}			18.3	25.5			
				n_{base}			1843	1677			
CV100M4 / II3D	13	38		M_{max}				28.0	38.0		
				n_{base}				1760	1626		
CV100L4 / II3D	21	64		M_{max}					33.7	44.0	64
				n_{base}					2003	1894	1645

Motor type	M_N [Nm]	M_{max} [Nm]	n_{max} [min^{-1}]	M_{max} n_{base} [Nm] [Hz]	MOVIDRIVE® 0110	0150	0220	0300	0370	0450	0550	0750
CV132S4 / II3D	31	94	3500	M_{max}	72	94						
				n_{base}	1850	1722						
CV132M4 / II3D	41	122		M_{max}		95	122					
				n_{base}		1850	1670					
CV132ML4 / II3D	49	148		M_{max}			139					
				n_{base}			1715					
CV160M4 / II3D	60	179		M_{max}			139	179				
				n_{base}			1792	1690				
CV160L4 / II3D	75	225		M_{max}				177	218			
				n_{base}				1882	1824			
CV180M4 / II3D	85	255	2500	M_{max}					218	255		
				n_{base}					1939	1894		
CV180L4 / II3D	98	293		M_{max}						260	293	
				n_{base}						1824	1786	
CV200L4 / II3D	149	447		M_{max}							329	412
				n_{base}							1830	1792

Speed class 3000 min^{-1}

Motor type	M_N [Nm]	M_{max} [Nm]	n_{max} [min^{-1}]	M_{max} n_{base} [Nm] [Hz]	MOVIDRIVE® 0015	0022	0030	0040	0055	0075	0110
CT71D4 / II3D	2.0	6	3500	M_{max} n_{base}	6.0 2280						
CT80N4 / II3D	3.8	11		M_{max} n_{base}		9.7 2560	11.0 2350				
CT90L4 / II3D	8.1	24		M_{max} n_{base}			12.7 2790	18.0 2650	24.0 2490		
CV100M4 / II3D	13	38		M_{max} n_{base}					26.5 2620	34.6 2490	
CV100L4 / II3D	18	54		M_{max} n_{base}						31.8 2800	49.0 2600

Motor type	M_N [Nm]	M_{max} [Nm]	n_{max} [min^{-1}]	M_{max} n_{base} [Nm] [Hz]	MOVIDRIVE® 0110	0150	0220	0300	0370	0450	0550	0750
CV132S4 / II3D	30	89	3500	M_{max} n_{base}	51 2740	69 2650						
CV132M4 / II3D	38	115		M_{max} n_{base}		67 2750	99 2600	114 2450				
CV132ML4 / II3D	44	133		M_{max} n_{base}			94 2765	124 2656	133 2547			
CV160M4 / II3D	54	163		M_{max} n_{base}			98 2630	131 2550	161 2470			
CV160L4 / II3D	72	217		M_{max} n_{base}				124 2720	155 2680	192 2620	216 2545	
CV180M4 / II3D	79	237	2500	M_{max} n_{base}					150 2790	191 2745	228 2700	
CV180L4 / II3D	94	281		M_{max} n_{base}						182 2620	220 2580	276 2540
CV200L4 / II3D	123	370		M_{max} n_{base}								293 2573

6.9 Soft-start units

Soft-start units are permitted for use with motors in category II3D as long as the motors are fitted with a TF temperature sensor.

7 Startup

7.1 Prerequisites for startup

	NOTES
	Observe the safety notes in section 2 during installation.

7.1.1 Before startup, make sure that:

- The drive is undamaged and not blocked.
- the measures stipulated in section "General Preparations" are performed after extended storage period,
- All connections have been made properly
- The direction of rotation of the motor/gearmotor is correct
  - (motor rotating clockwise: U, V, W to L1, L2, L3)
- All protective covers have been installed correctly.
- All motor protection equipment is active and set for the rated motor current
- The self-reengaging manual brake release is used in case of hoist drives
- There are no other sources of danger present

7.1.2 During startup, make sure that:

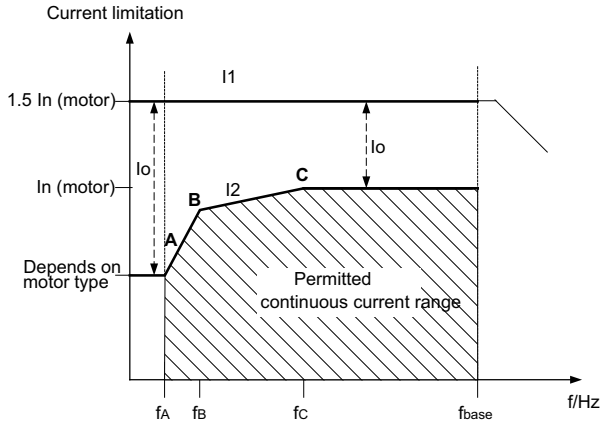
- The motor is running correctly (no overload, no speed fluctuation, no loud noises, etc.).
- The correct braking torque is set according to the specific application (see Sec. "Technical Data")
- in case of problems (see Sec. "Malfunctions")

	STOP
	In brake motors with self-reengaging manual brake release, the manual brake release lever must be removed after startup/maintenance! A bracket is provided for storing the lever on the outside of the motor.

7.2 Parameter setting: Frequency inverters for category 2G

7.2.1 Parameter setting

The parameters that have to be set for current monitoring depend on the motor. The exact values are specified in the EC prototype test certificate.



After motor startup, current limitation I1 is active. Current limit I2 determines the permanently permitted current. The current limitation function can be activated during startup or via parameter P560 current limitation Ex e motor (for permitted motors).

The characteristic curve is defined by operating points A, B and C. The following parameters are set during startup:

Parameter	Point A	Point B	Point C
Frequency [Hz]	P561	P563	P565
Current limitation in % of I_N	P562	P564	P566

7.2.2 Overload protection

Operation above the permitted current range is permitted for 60 seconds. To prevent a sudden reduction of the current limitation and thus torque shocks, after about 50 seconds, the current is reduced to the permitted value along a ramp within 10 seconds. The current can again exceed the permitted range after a recovery time of 10 minutes. Operation below 5 Hz is permitted for 60 seconds. After this time has elapsed, the unit switches off with error F110 Ex e protection and performs an emergency stop as an error response.

The binary inputs P62_ can be parameterized to "Ex e current limitation active".

Conditions for setting the output ("1" signal):

- Current limit 1 exceeded
- Recovery time not elapsed yet
- Operation < 5 Hz longer than 60 seconds

The current-time monitoring is not reset by an error reset.

The current-time monitoring is active both for mains operation and 24 V backup mode. If the mains is switched off without 24 V backup mode, the monitoring function is reset completely.

Voltage drop across SEW output filters

Filter				Choke	Voltage drop [V]					
					V = 400 V			V = 500 V		
Type	Size	I_{N400} (A)	I_{N500} (A)	L (mH)	50 Hz (V)	60 Hz (V)	87 Hz (V)	50 Hz (V)	60 Hz (V)	87 Hz (V)
HF 008-503	1	2,5	2	11	15	18	26	12	14	21
HF 015-503	1	4	3	9	20	24	34	15	18	26
HF 022-503	1	6	5	7	23	27	40	19	23	33
HF 030-503	1	8	6	5,5	24	29	42	18	22	31
HF 040-503	2	10	8	4,5	24	29	43	20	24	34
HF 055-503	2	12	10	3,2	21	25	36	17	21	30
HF 075-503	2	16	13	2,4	21	25	36	17	20	30
HF 023-403	3	23	19	1,6	20	24	35	17	20	29
HF 033-403	3	33	26	1,2	22	26	37	17	20	30
HF 047-403	4	47	38	0,8	20	25	36	17	20	29

NOTE

For SEW ouput chokes (HD..), the voltage drop is negligible (current compensated).

Voltage drop at motor cables

Line cross section	Load with I [A] =																		
	4	6	8	10	13	16	20	25	30	40	50	63	80	100	125	150	200	250	300
Copper	Voltage drop ΔV [V] with length = 100 m and ϑ = 70 °C																		
1.5 mm²	5.3	8	10.6	13.3	17.3	21.3	1)	1)	1)	1)	1)	1)	1)	1)	1)	1)	1)	1)	1)
2.5 mm²	3.2	4.8	6.4	8.1	10.4	12.8	16	1)	1)	1)	1)	1)	1)	1)	1)	1)	1)	1)	1)
4 mm²	1.9	2.8	3.8	4.7	6.5	8.0	10	12.5	1)	1)	1)	1)	1)	1)	1)	1)	1)	1)	1)
6 mm²					4.4	5.3	6.4	8.3	9.9	1)	1)	1)	1)	1)	1)	1)	1)	1)	1)
10 mm²						3.2	4.0	5.0	6.0	8.2	10.2	1)	1)	1)	1)	1)	1)	1)	1)
16 mm²								3.3	3.9	5.2	6.5	7.9	10.0	1)	1)	1)	1)	1)	1)
25 mm²									2.5	3.3	4.1	5.1	6.4	8.0	1)	1)	1)	1)	1)
35 mm²											2.9	3.6	4.6	5.7	7.2	8.6	1)	1)	1)
50 mm²														4.0	5.0	6.0	1)	1)	1)
70 mm²																	4.6	1)	1)
95 mm²																	3.4	4.2	1)
150 mm²																		2.7	3.3
185 mm²																			2.7

1) Load not permitted according to IEC60364-5-52.

7.3 Parameter setting: Frequency inverter for categories 3G, 3D, 3GD

7.3.1 General

Use the appropriate operating instructions for frequency inverter startup.

The current MOTION-Studio or MOVITOOLSsoftware will lead you through the startup procedure. It is essential to note that the maximum speed must be reset after each guided startup.

Note the following mandatory frequency inverter settings for operating DT../DV.. AC motors in categories II3G, II3D and II3GD:

7.3.2 Setting the maximum frequency or maximum speed

The frequency inverter parameters which limit the maximum motor speed must be set according to the assignment tables for motor/frequency inverter combinations.

7.3.3 Setting the "IxR" and "Boost" parameters

The parameters must be set as described in the following section. The motor may not be at operating temperature but must have cooled off to ambient temperature.

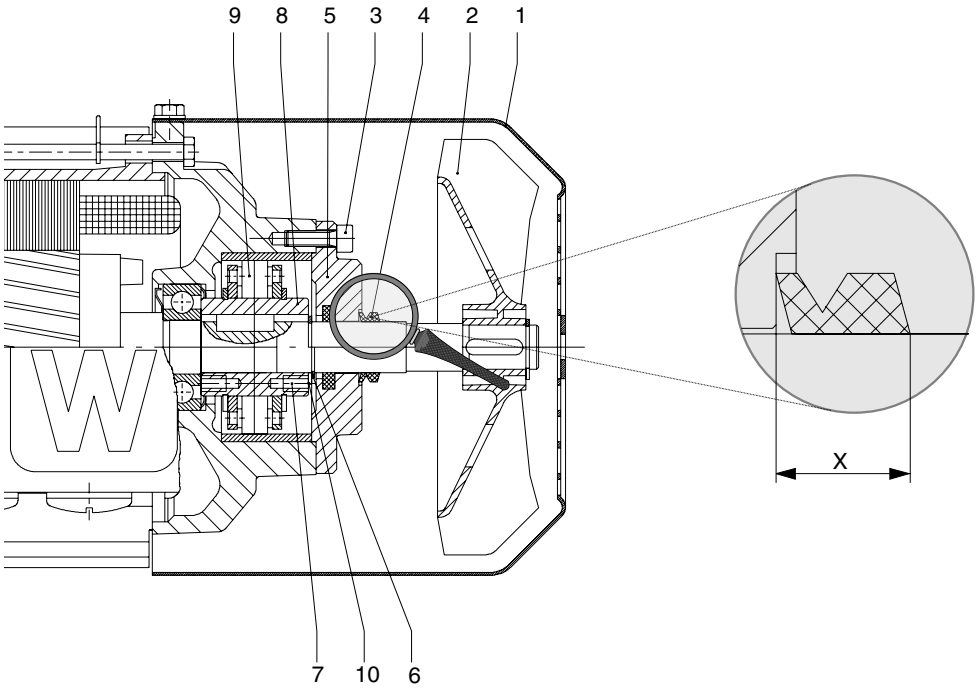
- Using frequency inverters of the MOVIDRIVE® and MOVITRAC®.

  Set parameter for "Automatic adjustment" to "Yes". Enable drive briefly; the parameters "IxR" and "Boost" are determined and saved. Then set parameter for "Automatic adjustment" to "No".

Manually changing the "IxR" and "Boost" parameters

- If altering the "IxR" and "Boost" parameters manually, technical application reasons dictate that the maximum current limit value in the "Assignment of motor - frequency inverter, setting the current limitation" table must not be exceeded.

7.4 Altering the blocking direction on motors with a backstop



[1] Fan guard
[2] Fan
[3] Machine screw
[4] V-ring
[5] Felt ring
[6] Circlip
[7] Threaded hole
[8] Driver
[9] Wedge element train
[10] Shim washer

7.4.1 Dimension "x" after installation

Motor	Dimension "x" after installation
DT71/80	6.7 mm
DT90/DV100	9.0 mm
DV112/132S	9.0 mm
DV132M-160M	11.0 mm
DV160L - 225	11.0 mm
DV250 - 280	13.5 mm

Do not start up the motor in blocking direction (ensure correct connection of power supply with motor). Note the direction of rotation of the output shaft and the number of stages when mounting the motor on a gear unit. For inspection purposes, you can operate the backstop one time with half the motor voltage in the blocking direction:

⚠ DANGER!

Risk of crushing if the drive starts up unintentionally.
Severe or fatal injuries.
- Disconnect the motor from the power supply before starting work and protect it against unintentional re-start!

1. Remove the fan guard [1] and the fan [2]; remove the machine screws [3].
2. Remove the V-ring [4] and sealing flange with felt ring [5] (Collect the grease for subsequent use).
3. Remove the circlip [6] (not with DT71/80); additionally for DV132M-160M: remove the shim washers [10].
4. Pull the driver [8] and wedge element train [9] completely off using the threaded holes [7], turn them by 180° and press them back on.
5. Re-fill the grease.
6. **Important: Do not exert pressure on or hit the wedge elements – danger of damaging the material!**
7. During the press-in operation - shortly before the wedge element penetrates the outer ring - slowly turn the rotor shaft by hand in the direction of rotation. This allows the wedge element to slide into the outer ring more easily.
8. Install the remaining parts of the backstop by following steps 4. to 2. in reverse order. Note the installation dimension "x" for the V-ring [4].

7.5 Anti-condensation heating for motors in category II3D

In category II/3D motors, connect the anti-condensation heating to the connection leads marked H1 and H2. Check the connection voltage against the voltage specification on the nameplate.

Anti-condensation heating for motors in category II3D:

- Must not be switched on until the motor has been switched off.
- Must not be switched on while the motor is operating.

8 Inspection / Maintenance

The motor may be repaired or modified only by SEW service personnel or staff of repair workshops or plants who has had the necessary training for this.

Before re-startup of the motor, make sure that all regulations are complied with and document this with a label on the motor or a written test report.

	NOTE ON EXPLOSION PROTECTION
	• Maintenance and repair work must always be performed by SEW-EURODRIVE or repair workshops for electrical drives. • Use only original spare parts from the relevant and valid spare parts lists; otherwise, the explosion-poof approval for the motor will become void. • The routine test must be repeated whenever motor parts relating to explosion protection are replaced. • Motors can become very hot during operation – danger of burns! • Isolate the motor and brake from the power supply before starting work, safeguarding them against unintentional re-start! • Ensure that the motor is assembled correctly and all openings have been plugged after service and maintenance work. • Clean motors in explosion-proof areas regularly. Prevent dust from building up higher than 5 mm. • Clean the optional VE forced cooling fan at regular intervals. Prevent dust from building up higher than 5 mm. Observe the operating instructions of the forced cooling fan. • Never rework the surfaces of the ignition gap. • Always keep ignition gap clean and protect it from corrosion. • Explosion protection is largely dependent on the IP enclosure. Therefore, always check that the seals are fitted correctly and in perfect condition when performing any work on the machine. • Apply grease with a grease depot (Klüber Patemo GHY133N) to the lip of the oil seal before assembly. • Always perform safety and functional tests following all maintenance and repair work (thermal protection, brake). • Explosion protection can only be ensured if motors and brakes are serviced and maintained correctly.

8.1 Inspection and maintenance periods

Unit / unit part	Time interval	What to do?
Brake BMG02, BR03, BMG05-8, BM15-62	• **If used as a working brake:** At least every 3000 hours of operation[1)] • **If used as a holding brake:** Every 2 to 4 years, depending on operating conditions [1)]	Inspect the brake • Measure brake disc thickness • Brake disc, lining • Measure and set working air gap • Pressure plate • Carrier / gearing • Pressure rings • Vacuum up the abraded matter • Inspect the switch elements and change if necessary (e.g. in case of burn-out)
BC brake		• Adjust the brake
Motor	• **Every 10,000 hours of operation**	Inspect the motor: • Check ball bearings and replace if necessary • Replace the oil seal • Clean cooling air passages
Motor with backstop		• Change the low-viscosity grease of the backstop
Drive	• Varies (depending on external factors)	• Repair or renew surface / anticorrosion coating
Air ducts and surfaces of the motor and the forced cooling fan if applicable	• Varies (depending on external factors)	• Clean air ducts and surfaces

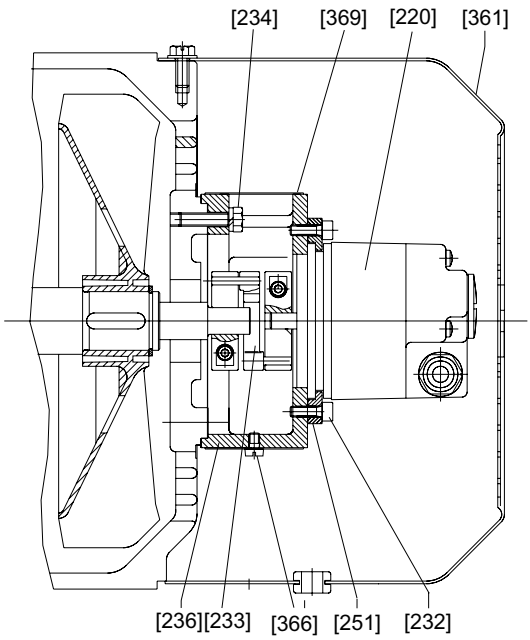
1) The amount of wear is affected by many factors and the service life may be short. The machine designer must calculate the required inspection/maintenance intervals individually in accordance with the project planning documents (e.g. "Project Planning for Drives").

8.2 Preliminary work for motor and brake maintenance

⚠ DANGER!

Risk of crushing if the drive starts up unintentionally.
Severe or fatal injuries.
- Isolate the motor and brake from the power supply before starting work, safeguarding them against unintentional power-up!

8.2.1 Removing the incremental encoder EV2.



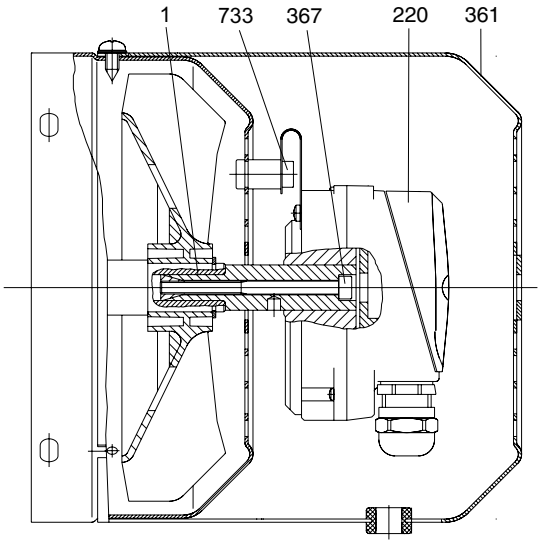
Incremental encoder EV2. to size 225

[220] Encoder
[232] Machine screw
[233] Coupling
[234] Hex head screw
[236] Adapter flange
[251] Conical spring washer
[361] Protective cowl / fan guard
[366] Machine screw
[369] Cover plate

1. Remove the protective cowl [361]. Remove forced cooling fan first, if installed.
2. Unscrew the screw [366] from the adapter flange and remove the cover plate [369].
3. Unscrew the clamping hub connection of the coupling.
4. Loosen the retaining screws [232] and turn the conical spring washers [251] outwards.
5. Remove the encoder [220] together with the coupling [233].
6. Lever off the adapter flange [236] after removing the screws [234].

	NOTE
	During re-assembly, make sure the runout of the shaft end is ≤ 0.05 mm. Brakes for the encoder mounting must be completely replaced.

8.2.2 Removing incremental encoder ES1. / ES2.



ES1. / ES2.

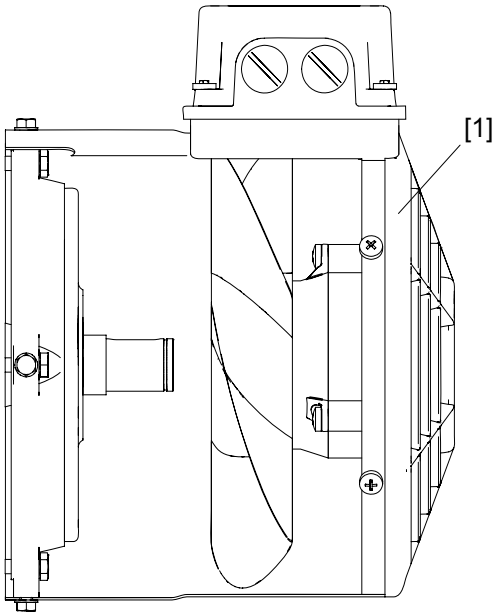
[220] Encoder
[361] Protective cowl
[367] Retaining bolt
[733] Retaining screw for the torque arm

1. Remove the protective cowl [361].
2. Unscrew the retaining screws [733] for the torque arm.
3. Open the screw cover at the rear of the incremental encoder [220].
4. Unscrew the central retaining screw [367] by about two to three turns and loosen the cone by tapping lightly on the head of the screw. Then unscrew the retaining screw and remove the incremental encoder.

	NOTE
	During re-assembly: – Apply NOCO®-FLUID to the encoder spigot – Tighten the central retaining screw [367] to 2.9 Nm

	NOTE ON EXPLOSION PROTECTION
	During re-assembly, make sure the encoder shaft does not rub against the fan guard.

8.2.3 Removing the VE forced cooling fan

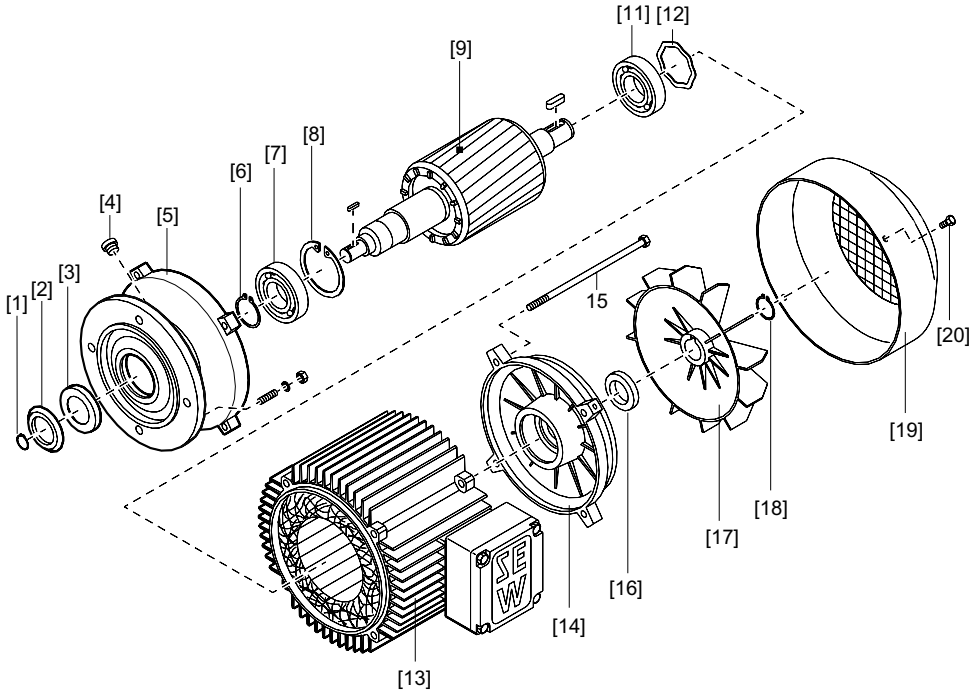


1. Before installing the forced cooling fan [1], check the fan wheel and the fan motor for damage.
2. After installation, turn the fan wheel to make sure that the fan wheel does not rub in any place. The minimum distance between fan wheel and stationary parts is 1 mm.

	NOTE
	Observe the operating instructions of the forced cooling fan (page 107).

8.3 Inspection / maintenance on the motor

8.3.1 Example: Motor DFT90



54008AXX

[1] Circlip
[2] Oil-flinger ring
[3] Oil seal
[4] Screw plug
[5] A-(flange) endshield
[6] Circlip
[7] Ball bearings
[8] Circlip
[9] Rotor
[11] Ball bearings
[12] Shim washer
[13] Stator
[14] Non drive-end bearing shield
[15] Hex head screw
[16] V-ring
[17] Fan
[18] Circlip
[19] Fan guard
[20] Retaining screw

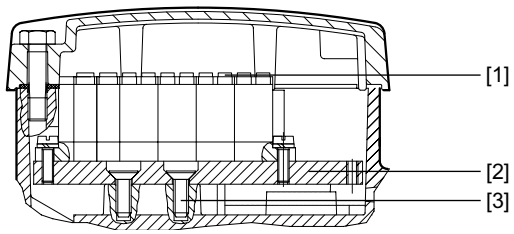
8.3.2 Procedure

⚠ DANGER!

Risk of crushing if the drive starts up unintentionally.
Severe or fatal injuries.
- Isolate the motor and brake from the power supply before starting work, safeguarding them against unintentional power-up!

1. Remove the forced cooling fan and incremental encoder, if installed (see Sec. "Preliminary work for motor and brake maintenance")
2. Remove the flange cover or fan guard [19] and the fan [17]
3. Remove the hexagon head cap screws [15] from the drive end bearing shield [5] and the non drive-end bearing shield [14], release the stator [13] from the drive-end bearing shield
4. **Motors with BM/BMG brake:**
   - Open the terminal box, loosen the brake cable from the rectifier
   - Press off the B-endshield and brake from the stator, lift it off carefully (feed brake cable using the trailing wire)
   - Pull the stator back by approx. 3 to 4 cm
5. Visual inspection: Is there any moisture or gear unit oil inside the stator?
   - If not, continue with 9
   - If there is condensation, continue with 7
   - If there is gear oil, have the motor repaired by a specialist workshop
6. If there is moisture inside the stator:
   - With gearmotors: Remove the motor from the gear unit
   - Motors without a gear unit: Remove the A-flange
   - Remove the rotor [9]
7. Clean the winding, dry it and check it electrically (see Sec. "Preliminary work")
8. Install new ball bearings [7], [11] (only use authorized ball bearings - see Sec. "Permitted ball bearing types")
9. Fit a new oil seal [3] in the drive end bearing shield (apply grease to the oil seals (Klueber Petamo GHY 133N) before assembly)
10. Reseal the stator seat ("Hylomar L Spezial") and grease the V-ring or labyrinth seal (DR63)
11. Install the motor, brake and accessories
12. Check the gear unit (→ gear unit operating instructions)

8.3.3 Replacing the adapter plate



[1] Tension spring terminal strip
[2] Adapter plate
[3] Screws

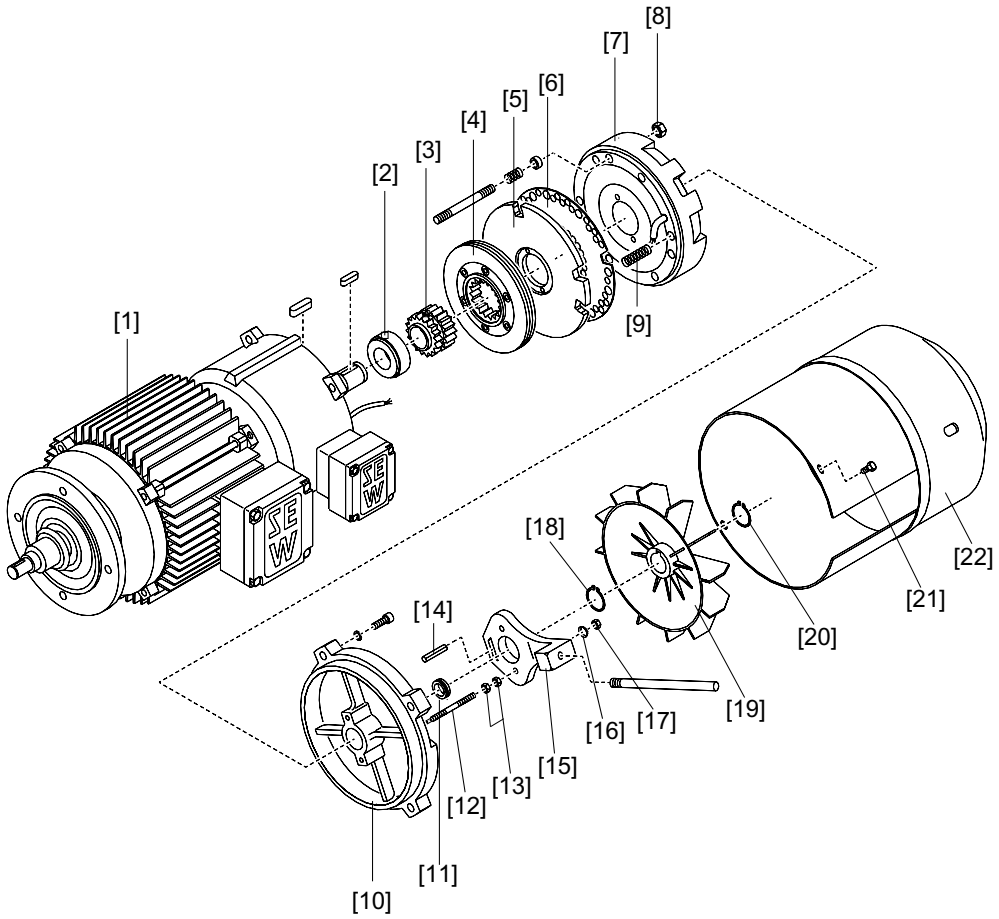
To prevent screws from loosening, secure the screws [2] that are used to attach the adapter plate [1] in size 63 motors using Loctite or a similar substance.

8.3.4 Lubricating the backstop

The backstop is supplied with the corrosion protection low-viscosity grease Mobil LBZ. If you want to use a different grease, make sure that it complies with NLGI class 00/000, with a base oil velocity of 42 mm^2/s at 40 °C on a lithium soap and mineral oil base. The application temperature range is from -50 °C to +90 °C. See the following table for the amount of grease required.

Motor type	71/80	90/100	112/132	132M/160M	160L/225	250/280
Grease [g]	9	15	15	20	45	80

8.4 Inspection and maintenance of the brake BC



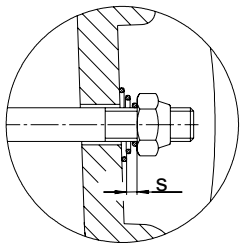
[1] Motor
[2] Spacer ring
[3] Driver
[4] Brake disc
[5] Pressure plate
[6] Circular spring
[7] Brake disc
[8] Pressure plate
[9] Damping plate (BMG only)
[10a] Stud
[10b] Counter spring
[10c] Pressure ring
[10e] Hex nut
[11] Brake spring
[12] Brake coil body
[13] for BMG: Gasket
for BM: V-ring
[14] Dowel pin
[15] Release lever with hand lever
[16] Stud (2 pcs.)
[17] Conical spring
[18] Hexagonal nut
[19] Fan
[20] Circlip
[21] Fan guard
[22] Hex head screw
[23] Clamping strap

8.4.1 Brake BC, setting the working air gap

⚠ DANGER!

Risk of crushing if the drive starts up unintentionally.
Severe or fatal injuries.
- Isolate the motor and brake from the power supply before starting work, safeguarding them against unintentional power-up!

1. Remove the following parts (replace in case of wear):
   - Fan guard [22], circlip [20], fan [19], circlip [18], setting nuts [17], conical coil springs [16], release lever [15], nuts [13], studs [12], V-ring [11], housing cover [10]
   - Make sure not to damage the ignition gap when removing the housing cover [10].
2. Vacuum up the abraded matter
3. Carefully tighten the hex nuts [8]
   - evenly until a slight resistance is noticeable (means: working air gap = 0)
4. Turn back hex nuts
   - by ca. 120° (means: working air gap set)
5. Re-install the following removed parts:
   - Housing cover [10] (Important: During installation, make sure that the ignition gaps are undamaged, clean and free from rust)
   - V-ring [11], studs [12], nuts [13], release lever [15], conical coil springs [16]
6. With manual brake release: Use setting nuts [17] to set the floating clearance "s" between the conical coil springs [16] (pressed flat) and the setting nuts (→ following figure)



Brake	Floating clearance s [mm]
BC05	1.5
BC 2	2

Important: This floating clearance "s" is necessary so that the pressure plate can move up as the brake lining wears. Otherwise, reliable braking is not guaranteed.

7. Reinstall the fan [19] and fan guard [22].

8.4.2 Changing the BC braking torque

The braking torque can be changed in steps (see Sec. "Work done, working air gap, braking torques of brake BMG 05-8, BC"):

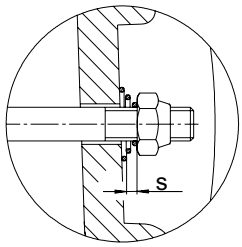
- by installing different brake springs
- by changing the number of brake springs

⚠ DANGER!

Risk of crushing if the drive starts up unintentionally.
Severe or fatal injuries.
- Isolate the motor and brake from the power supply before starting work, safeguarding them against unintentional power-up!

1. Remove the following parts (replace in case of wear):
   - Fan guard [22], circlip [20], fan [19], circlip [18], setting nuts [17], conical coil springs [16], release lever [15], nuts [13], studs [12], V-ring [11], housing cover [10]
   - Make sure not to damage the ignition gap when removing the housing cover [10].
2. Vacuum up the abraded matter
3. Unscrew the hex nuts [8] and pull off the brake coil body [7] by about 70 mm (caution: brake cable)
4. Change or add brake springs [9]
   - Arrange brake springs symmetrically
5. Install the brake coil body and hex nuts
   - Arrange the brake cable in the pressure chamber while doing so
6. Turn back hex nuts
   - by ca. 120° (means: working air gap set)
7. Re-install the following removed parts:
   - Housing cover [10] (Important: During installation, make sure that the ignition gaps are undamaged, clean and free from rust)
   - V-ring [11], studs [12], nuts [13], release lever [15], conical coil springs [16]

8. With manual brake release: Use setting nuts [17] to set the floating clearance "s" between the conical coil springs [16] (pressed flat) and the setting nuts (→ following figure)



Brake	Floating clearance s [mm]
BC05	1.5
BC 2	2

Important: This floating clearance "s" is necessary so that the pressure plate can move up as the brake lining wears. Otherwise, reliable braking is not guaranteed.

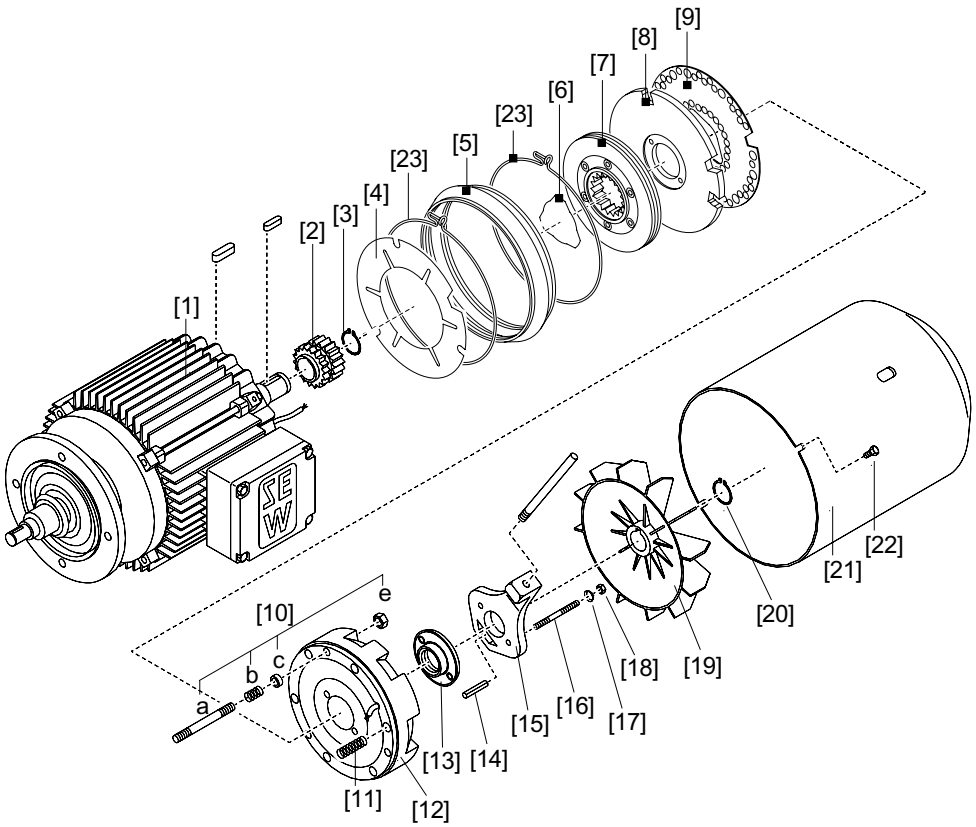
9. Reinstall the fan [19] and fan guard [22].

	NOTES
	• The lockable manual brake release is already released if resistance is encountered when operating the grub screw. • The self-reengaging manual brake release can be released with normal hand pressure.

	STOP
	In brake motors with self-reengaging manual brake release, the manual brake release lever must be removed after startup/maintenance! A bracket is provided for storing the lever on the outside of the motor.

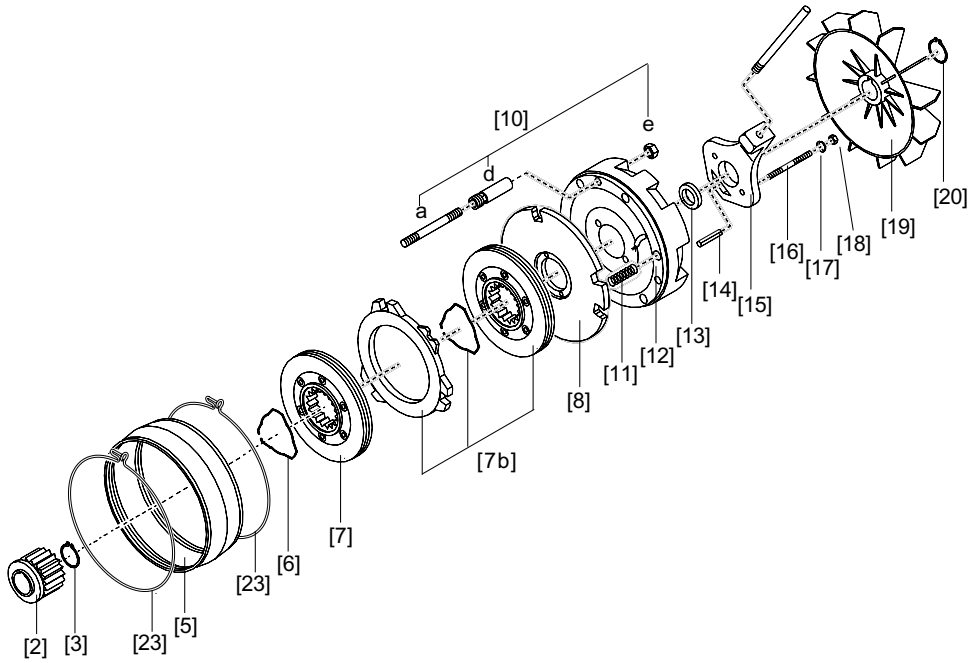
8.4.3 Brakes BMG, BM for category II3G/II3D motors

BMG 05-8, BM 15
brake



[1] Motor
[2] Spacer ring
[3] Driver
[4] Brake disc
[5] Pressure plate
[6] Damping plate
[7] Brake coil body
[8]Hexagonal nut
[9] Brake spring
[10] Housing cover
[11] V-ring
[12] Stud
[13] Nuts
[14] Dowel pin
[15] Release lever
[16] Conical spring
[17] Setting nut
[18] Circlip
[19] Fan
[20] Circlip
[21] Retaining screw
[22] Fan guard

BM30-62 brake



[2]	Driver	[8]	Pressure plate	[15]	Release lever with hand lever
[3]	Circlip	[10a]	Stud (3 pcs.)	[16]	Stud (2 pcs.)
[5]	Rubber sealing collar	[10d]	Adjusting sleeve	[17]	Conical spring
[6]	Circular spring	[10e]	Hexagonal nut	[18]	Hexagonal nut
[7]	Brake disc	[11]	Brake spring	[19]	Fan
[7b]	only BM 32, 62:	[12]	Brake coil body	[20]	Circlip
	Brake stationary disk, annular spring,	[13]	V-ring	[23]	Clamping strap
	Brake disc	[14]	Dowel pin		

8.4.4 Checking the brake, setting the working air gap

⚠ DANGER!

Risk of crushing if the drive starts up unintentionally.
Severe or fatal injuries.
- Isolate the motor and brake from the power supply before starting work, safeguarding them against unintentional power-up!

1. Remove the following:
   - Forced cooling fan and incremental encoder, if installed (see Sec. "Preliminary work for motor and brake maintenance")
   - Flange cover or fan guard [21]
2. Push the rubber sealing collar [5] aside by loosening the clamp. Extract up the abraded matter

3. Check the brake disc [7, 7b]

   The brake lining is subject to wear. it is essential that its thickness is not less than the specified minimum value. To be able to estimate how much wear has occurred since the last inspection, the thickness of the new brake discs is also given.

Motor type	Brake type	Minimum disc brake thickness [mm]	New disc brake thickness [mm]
D(F)T71. - D(F)V100.	BMG05 - BMG4	9	12.3
D(F)V112M - D(F)V132S	BMG8	10	13.5
D(F)V132M - D(F)V225M	BM15 - BM62	10	14.2

   Replace the brake disc when the brake disc thickness is below the minimum (see Sec. "Changing the BMG05 - 8, BM15 - 62 brake discs").

4. **For BM30-62:** Loosen the setting sleeve [10d] by turning it towards the bearing end shield
5. Measure the working air gap A (→ following figure)

   (use a feeler gauge and measure at three points offset by 120°)

   – In BM, between the pressure plate [8] and the brake coil body [12]

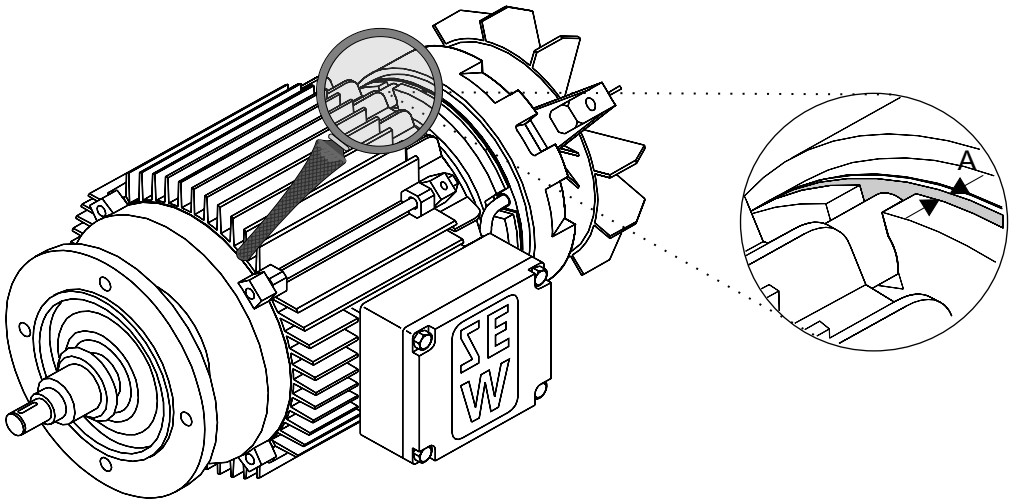
   – With BMG, between the pressure plate [8] and the damping plate [9]
6. Tighten the hexagon nuts [10e]

   – Until the working air gap is set correctly (see Sec. "Technical Data")

   – In BM 30-62, until the working air gap is initially 0.25 mm
7. **For BM30-62:** Tighten the setting sleeves

   – Against the brake coil body

   – Until the working air gap is set correctly (see Sec. "Technical Data")
8. Install the rubber sealing collar back in place and re-install the dismantled parts



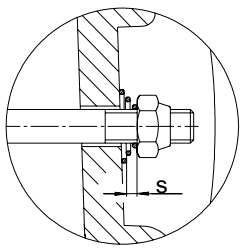
8.4.5 Replacing the BMG brake disk

When fitting a new brake disc (in BMG 05-4 ≤ 9 mm; in BMG 8 - BM 62 ≤ 10 mm) inspect the other removed parts as well and install new ones if necessary.

⚠ DANGER!

Risk of crushing if the drive starts up unintentionally.
Severe or fatal injuries.
- Isolate the motor and brake from the power supply before starting work, safeguarding them against unintentional power-up!

1. Remove the following:
   – Forced cooling fan and incremental encoder, if installed (see Sec. "Preliminary work for motor and brake maintenance")
   – Flange cover or fan guard [21], circlip [20] and fan [19]
2. Remove the rubber sealing collar [5] and the manual brake release:
   – Setting nuts [18], conical coil springs [17], studs [16], release lever [15]
3. Unscrew hex nuts [10e], carefully pull off the brake coil body [12] (brake cable!) and take out the brake springs [11]
4. Remove the damping plate [9], pressure plate [8] and brake disc [7, 7b] and clean the brake components
5. Install a new brake disc
6. Re-install the brake components
   – Except for the rubber sealing collar, fan and fan guard, set the working air gap (→ Sec. "Inspecting brake BMG 05-8, BM 30-62, setting the working air gap", points 4 to 7)
7. With manual brake release: Use setting nuts [18] to set the floating clearance "s" between the conical coil springs [17] (pressed flat) and the setting nuts (→ following figure)



Brake	Floating clearance s [mm]
BMG05-1	1.5
BMG2-8	2
BM15-62	2

Important: This floating clearance "s" is necessary so that the pressure plate can move up as the brake lining wears. Otherwise, reliable braking is not guaranteed.

8. Install the rubber sealing collar back in place and re-install the dismantled parts.

8.4.6 Changing the braking torque

The braking torque can be changed in steps (see Sec. "Technical Data")

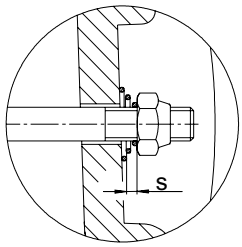
- by installing different brake springs
- by changing the number of brake springs

⚠ DANGER!

Risk of crushing if the drive starts up unintentionally.
Severe or fatal injuries.
- Isolate the motor and brake from the power supply before starting work, safeguarding them against unintentional power-up!

1. Remove the following:
   – Forced cooling fan and incremental encoder, if installed (see Sec. "Preliminary work for motor and brake maintenance")
   – Flange cover or fan guard [21], circlip [20] and fan [19]
2. Remove the rubber sealing collar [5] and the manual brake release:
   – Setting nuts [18], conical coil springs [17], studs [16], release lever [15]
3. Unscrew hex nuts [10e], pull off the brake coil body [12]
   – by approx. 50 mm (watch the brake cable!)
4. Change or add brake springs [11]
   – Arrange brake springs symmetrically
5. Re-install the brake components
   – Except for the rubber sealing collar, fan and fan guard, set the working air gap (see Sec. "Inspecting brake BMG 05-8, BM 15-62", points 5 to 8)

6. With manual brake release: Use setting nuts [18] to set the floating clearance "s" between the conical coil springs [17] (pressed flat) and the setting nuts (see following figure)



Brake	Floating clearance s [mm]
BMG05-1	1.5
BMG2-8	2
BM15-62	2

Important: This floating clearance "s" is necessary so that the pressure plate can move up as the brake lining wears. Otherwise, reliable braking is not guaranteed.

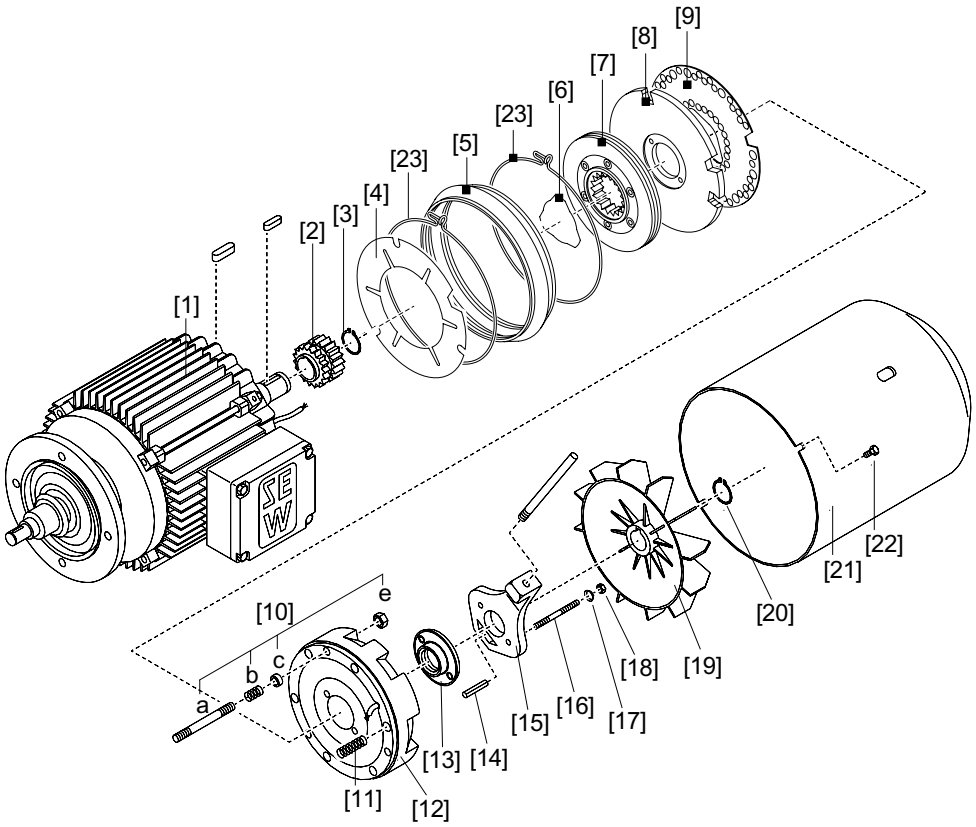
7. Install the rubber sealing collar back in place and re-install the dismantled parts.

STOP	**STOP**
	Replace setting nuts [18] and hexagon nuts [10e] if the removal procedure is repeated!

8.5 Inspection and maintenance of BMG, BM

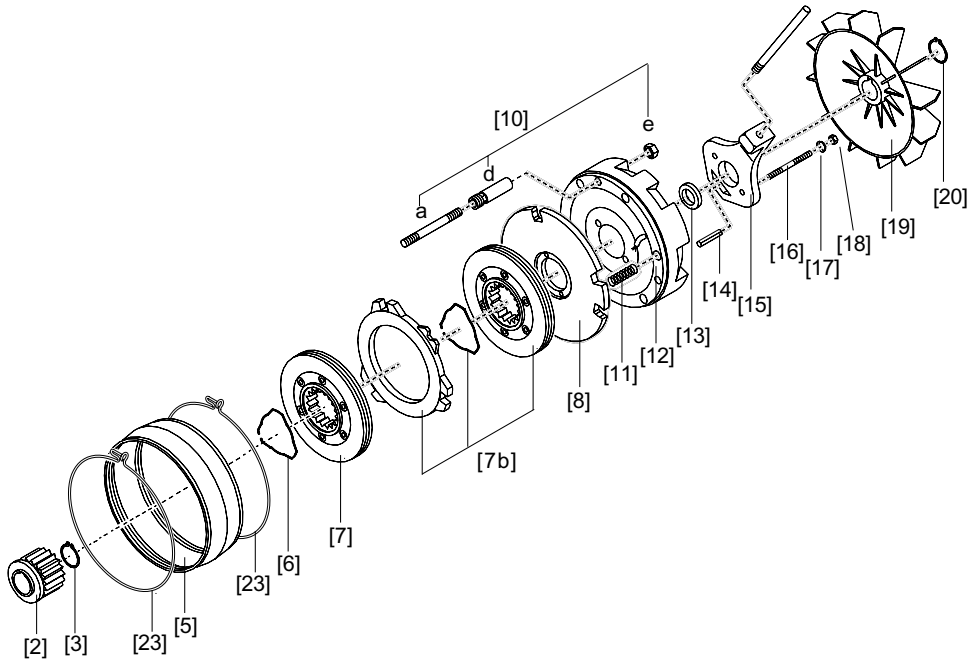
8.5.1 Brakes BMG, BM for category II3G/II3D motors

BMG 05-8, BM 15
brake



[1] Motor
[2] Spacer ring
[3] Driver
[4] Brake disc
[5] Pressure plate
[6] Damping plate
[7] Brake coil body
[8]Hexagonal nut
[9] Brake spring
[10] Housing cover
[11] V-ring
[12] Stud
[13] Nuts
[14] Dowel pin
[15] Release lever
[16] Conical spring
[17] Setting nut
[18] Circlip
[19] Fan
[20] Circlip
[21] Retaining screw
[22] Fan guard

BM30-62 brake



[2]	Driver	[8]	Pressure plate	[15]	Release lever with hand lever
[3]	Circlip	[10a]	Stud (3 pcs.)	[16]	Stud (2 pcs.)
[5]	Rubber sealing collar	[10d]	Adjusting sleeve	[17]	Conical spring
[6]	Circular spring	[10e]	Hexagonal nut	[18]	Hexagonal nut
[7]	Brake disc	[11]	Brake spring	[19]	Fan
[7b]	only BM 32, 62: Brake stationary disk, annular spring, Brake disc	[12]	Brake coil body	[20]	Circlip
		[13]	V-ring	[23]	Clamping strap
		[14]	Dowel pin		

8.5.2 Checking the brake, setting the working air gap

⚠ DANGER!

Risk of crushing if the drive starts up unintentionally.
Severe or fatal injuries.

- Isolate the motor and brake from the power supply before starting work, safeguarding them against unintentional power-up!

1. Remove the following:
   - Forced cooling fan and incremental encoder, if installed (see Sec. "Preliminary work for motor and brake maintenance")
   - Flange cover or fan guard [21]
2. Push the rubber sealing collar [5] aside by loosening the clamp. Extract up the abraded matter

3. Check the brake disc [7, 7b]

   The brake lining is subject to wear. it is essential that its thickness is not less than the specified minimum value. To be able to estimate how much wear has occurred since the last inspection, the thickness of the new brake discs is also given.

Motor type	Brake type	Minimum disc brake thickness [mm]	New disc brake thickness [mm]
D(F)T71. - D(F)V100.	BMG05 - BMG4	9	12.3
D(F)V112M - D(F)V132S	BMG8	10	13.5
D(F)V132M - D(F)V225M	BM15 - BM62	10	14.2

   Replace the brake disc when the brake disc thickness is below the minimum (see Sec. "Changing the BMG05 - 8, BM15 - 62 brake disc")

4. **For BM30-62:** Loosen the setting sleeve [10d] by turning it towards the bearing end shield
5. Measure the working air gap A (→ following figure)

   (use a feeler gauge and measure at three points offset by 120°)

   – In BM, between the pressure plate [8] and the brake coil body [12]

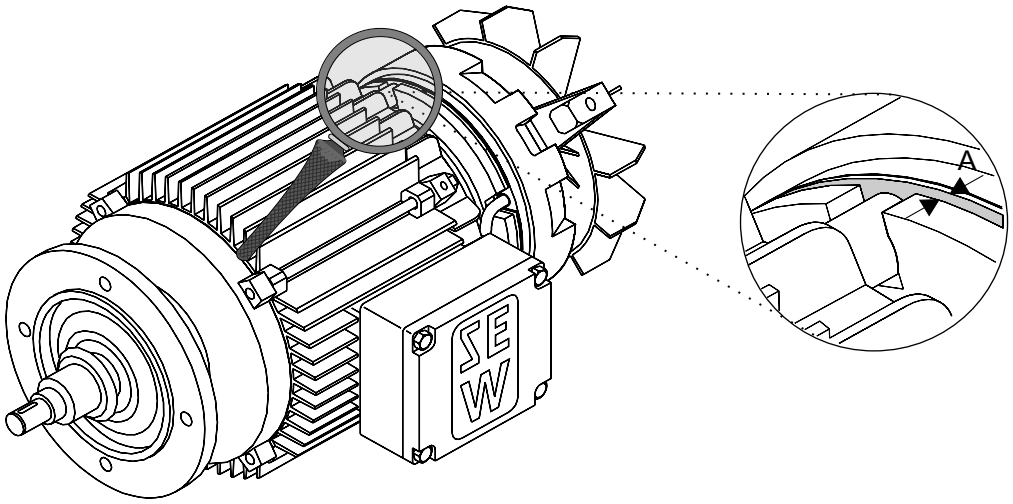
   – With BMG, between the pressure plate [8] and the damping plate [9]
6. Tighten the hexagon nuts [10e]

   – Until the working air gap is set correctly (see Sec. "Technical Data")

   – In BM 30-62, until the working air gap is initially 0.25 mm
7. **For BM30-62:** Tighten the setting sleeves

   – Against the brake coil body

   – Until the working air gap is set correctly (see Sec. "Technical Data")
8. Install the rubber sealing collar back in place and re-install the dismantled parts



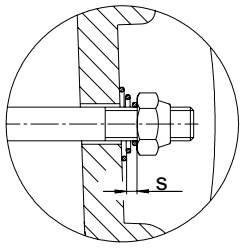
8.5.3 Replacing the BMG brake disk

When fitting a new brake disc (in BMG 05-4 ≤ 9 mm; in BMG 8 - BM 62 ≤ 10 mm) inspect the other removed parts as well and install new ones if necessary.

⚠ DANGER!

Risk of crushing if the drive starts up unintentionally.
Severe or fatal injuries.
- Isolate the motor and brake from the power supply before starting work, safeguarding them against unintentional power-up!

1. Remove the following:
   - Forced cooling fan and incremental encoder, if installed (see Sec. "Preliminary work for motor and brake maintenance")
   - Flange cover or fan guard [21], circlip [20] and fan [19]
2. Remove the rubber sealing collar [5] and the manual brake release:
   - Setting nuts [18], conical coil springs [17], studs [16], release lever [15], dowel pin [14]
3. Unscrew hex nuts [10e], carefully pull off the brake coil body [12] (brake cable!) and take out the brake springs [11]
4. Remove the damping plate [9], pressure plate [8] and brake disc [7, 7b] and clean the brake components
5. Install a new brake disc
6. Re-install the brake components
   - Except for the rubber sealing collar, fan and fan guard, set the working air gap (→ Sec. "Inspecting brake BMG 05-8, BM 30-62, setting the working air gap", points 4 to 7)
7. With manual brake release: Use setting nuts [18] to set the floating clearance "s" between the conical coil springs [17] (pressed flat) and the setting nuts (→ following figure)



Brake	Floating clearance s [mm]
BMG05-1	1.5
BMG2-8	2
BM15-62	2

Important: This floating clearance "s" is necessary so that the pressure plate can move up as the brake lining wears. Otherwise, reliable braking is not guaranteed.

8. Install the rubber sealing collar back in place and re-install the dismantled parts.

8.5.4 Changing the braking torque

The braking torque can be changed in steps (see Sec. "Technical Data")

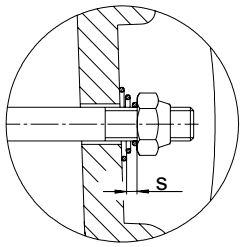
- by installing different brake springs
- by changing the number of brake springs

⚠ DANGER!

Risk of crushing if the drive starts up unintentionally.
Severe or fatal injuries.
- Isolate the motor and brake from the power supply before starting work, safeguarding them against unintentional power-up!

1. Remove the following:
   – Forced cooling fan and incremental encoder, if installed (see. Sec. "Preliminary work for motor and brake maintenance")
   – Flange cover or fan guard [21], circlip [20] and fan [19]
2. Remove the rubber sealing collar [5] and the manual brake release:
   – Setting nuts [18], conical coil springs [17], studs [16], release lever [15], dowel pin [14]
3. Unscrew hex nuts [10e], pull off the brake coil body [12]
   – by approx. 50 mm (watch the brake cable!)
4. Change or add brake springs [11]
   – Arrange brake springs symmetrically
5. Re-install the brake components
   – Except for the rubber sealing collar, fan and fan guard, set the working air gap (see Sec. "Inspecting brake BMG 05-8, BM 15-62", points 4 to 7)

6. With manual brake release: Use setting nuts [18] to set the floating clearance "s" between the conical coil springs [17] (pressed flat) and the setting nuts (see following figure)



Brake	Floating clearance s [mm]
BMG05-1	1.5
BMG2-8	2
BM15-62	2

Important: This floating clearance "s" is necessary so that the pressure plate can move up as the brake lining wears. Otherwise, reliable braking is not guaranteed.

7. Install the rubber sealing collar back in place and re-install the dismantled parts.

STOP	**STOP**
	Replace setting nuts [18] and hexagon nuts [10e] if the removal procedure is repeated!

9 Malfunctions

9.1 Motor problems

Malfunction	Possible cause	Remedy
Motor does not start up	Interruption in supply cable	Check connections, correct if necessary
	Brake does not release	→ Sec. "Brake faults"
	Fuse has blown	Replace fuse
	Motor protection has triggered	Check motor protection for correct setting, correct error if necessary.
	Motor protection does not switch, error in control	Check motor protection control, correct error if necessary.
Motor does not start or only with difficulty	Motor designed for delta connection but used in start connection.	Correct connection.
	Voltage or frequency deviate considerably from setpoint, at least while being switched on.	Provide better power supply system; check cross section of supply cable
Motor does not start in star connection, only in delta connection	Torque not sufficient in start connection	Switch on directly if delta inrush current is not too great; else, use a larger motor or a special design (contact SEW-EURODRIVE).
	Contact fault on star/delta switch	Rectify fault
Incorrect direction of rotation	Motor connected incorrectly	Swap over two phases
Motor hums and has high current consumption	Brake does not release	→ Sec. "Brake faults"
	Winding defective	Send motor to specialist workshop for repair
	Rotor rubbing	
Fuses blow or motor protection trips immediately	Short circuit in line	Rectify short circuit
	Short circuit in motor	Send motor to specialist workshop for repair
	Lines connected incorrectly	Correct connection.
	Ground fault on motor	Send motor to specialist workshop for repair
Severe speed loss under load	Overload	Measure power, use larger motor or reduce load if necessary
	Voltage drops	Increase cross section of incoming cable
Motor heats up excessively (measure temperature)	Overload	Measure power, use larger motor or reduce load if necessary
	Insufficient cooling	Correct cooling air supply or clear cooling air passages, retrofit forced cooling fan if necessary
	Ambient temperature is too high	Comply with permitted temperature range
	Motor in delta connection instead of star connection as provided for	Correct connection.
	Loose contact in incoming cable (one phase missing)	Rectify loose contact
	Fuse has blown	Look for and rectify cause (see above); replace fuse
	Mains voltage deviates from the rated motor voltage by more than 5 %. A higher voltage has a particularly unfavorable effect in motors with a low-speed winding since in these, the no-load current is already close to the rated current even when the voltage is normal.	Adjust motor to mains voltage.
	Rated operation type (S1 to S10, DIN 57530) exceeded, e.g. through excessive starting frequency	Adjust rated operation type of motor to required operating conditions; if necessary call in a specialist to determine correct drive
Excessively loud	Ball bearing compressed, contaminated or damaged	Re-align motor, inspect ball bearing (→ Sec. "Permitted ball bearing types"), grease if necessary (→ Sec. "Lubricant table for anti-friction bearings of SEW motors"), replace.
	Vibration of rotating parts	Rectify cause, possible imbalance
	Foreign bodies in cooling air passages	Clean cooling air passages

9.2 Brake problems

Malfunction	Possible cause	Remedy
Brake does not release	Incorrect voltage on brake control unit	Apply correct voltage
	Brake control unit failed	Install a new brake control system, check internal resistance and insulation of brake coil, check switchgear.
	Max. permitted working air gap exceeded because brake lining worn down.	Measure and set working air gap
	Voltage drop on supply cable > 10%	Provide for correct connection voltage; check cable cross section
	Inadequate cooling, brake overheats	Replace type BG brake rectifier with type BGE
	Brake coil has interturn fault or short circuit to exposed conductive part	Replace complete brake and brake control system (specialist workshop), check switchgear
	Rectifier defective	Replace the rectifier and brake coil
Motor does not brake	Working air gap not correct	Measure and set working air gap
	Brake lining worn down.	Replace entire brake disk
	Incorrect braking torque.	Change the braking torque (→ Sec. "Technical Data") • By the type and number of brake springs • Brake BMG 05: By installing the same brake coil body design as in brake BMG 1 • Brake BMG 2: By installing the same brake coil body design as in brake BMG 4
	BM(G) only: Working air gap so large that setting nuts come into contact.	Set the working air gap
	BR03, BM(G) only: Manual brake release device not set correctly	Set the setting nuts correctly
Brake is applied with time lag	Brake is switched on AC voltage side	Switch on DC and AC voltage sides (e.g. BSR); please refer to wiring diagram
Noises in vicinity of brake	Gearing wear caused by jolting startup	Check project planning
	Pulsating torques due to incorrectly set frequency inverter	Check/correct setting of frequency inverter according to operating instructions

9.3 Malfunctions when operating with a frequency inverter

The symptoms described in the "Motor Problems" section may also occur when the motor is operated with a frequency inverter. Please refer to the frequency inverter operating instructions for the meaning of the problems that occur and to find information about rectifying the problems.

9.4 Customer service

9.4.1 Customer service

Please have the following information to hand if you require the assistance of our customer service:

- Data from the nameplate (complete)
- Type and extent of the problem
- Time the problem occurred and any accompanying circumstances
- Assumed cause

10 Technical Data

10.1 Work done, working air gap, braking torques of BMG05-8, BR03, BC

Brake type	For motor size	Work done until maintenance	Working air gap [mm]		Braking torque settings				
					Braking torque	Type and number of brake springs		Order numbers for brake springs	
		[10^6 J]	min.[1]	max.	[Nm]	Standard	red	Standard	red
BMG05[2]	71 80	60	0.25	0.6	5.0 4.0 2.5 1.6 1.2	3 2 - - -	- 2 6 4 3	135 017 X	135 018 8
BC05	71 80	60	0.25	0.6	7.5 6.0 5.0 4.0 2.5 1.6 1.2	4 3 3 2 - - -	2 3 - 2 6 4 3	135 017 X	135 018 8
BMG1	80	60	0.25	0.6	10 7.5 6.0	6 4 3	- 2 3	135 017 X	135 018 8
BMG2[3]	90 100	130	0.25	0.6	20 16 10 6.6 5.0	3 2 - - -	- 2 6 4 3	135 150 8	135 151 6
BC2	90 100	130	0.25	0.6	30 24 20 16 10 6.6 5.0	4 3 3 2 - - -.	2 3 - 2 6 4 3	135 150 8	135 151 6
BMG4	100	130	0.25	0.6	40 30 24	6 4 3	- 2 3	135 150 8	135 151 6
BMG8	112M 132S	300	0.3	0.9	75 55 45 37 30 19 12.6 9.5	6 4 3 3 2 - - -	- 2 3 - 2 6 4 3	184 845 3	135 570 8

1) When checking the working air gap, note: Parallelism tolerances on the brake disk may give rise to deviations of ± 0.15 mm after a test run.

2) BMG05: Should the maximum braking torque (5 Nm) not be sufficient, the brake coil body of the BMG1 brake can be built in.

3) BMG2: Should the maximum braking torque (20 Nm) not be sufficient, the brake coil body of the BMG4 brake can be built in.

10.2 Work done, working air gap, braking torques of BM15 - 62

Brake type	For motor size	Work done until maintenance	Working air gap [mm]		Braking torque settings				
					Braking torque	Type and number of springs		Order number of springs	
		[10^6 J]	min.[1]	max.	[Nm]	Standard	red	Standard	red
BM15	132M, ML 160M	500	0.3	0.9	150 125 100 75 50 35 25	6 4 3 3 - - -	- 2 3 - 6 4 3	184 486 5	184 487 3
BM30	160L 180	750			300 250 200 150 125 100 75 50	8 6 4 4 2 - - -	- 2 4 - 4 8 6 4	187 455 1	187 457 8
BM31	200 225	750							
BM32[2]	180	750	0.4	0.9	300 250 200 150 100	4 2 - - -	- 4 8 6 4	187 455 1	187 457 8
BM62[2]	200 225	750			600 500 400 300 250 200 150 100	8 6 4 4 2 - - -	- 2 4 - 4 8 6 4		

1) When checking the working air gap, note: Parallelism tolerances on the brake disk may give rise to deviations of ± 0.15 mm after a test run.

2) Double disk brake

10.3 Permitted work done by the brake

⚠ DANGER!

Risk of explosion if the maximum permitted braking work per braking operation is exceeded.

Severe or fatal injuries.

- The maximum braking work per brake application shown in the characteristic curves must not be exceeded - not even in the case of emergency brake applications.

If you are using a brake motor, you have to check whether the brake is approved for use with the required starting frequency Z. The following diagrams show the permitted work done per cycle W_{max} for different brakes and rated speeds. The values are given with reference to the required starting frequency Z in cycles/hour (1h).

For assistance in determining the braking work, refer to "Drive Engineering - Practical Implementation: Drive Planning".

10.3.1 Category II3D (BMG 05 - BM 62) and category II2G (BC05 and BC2)

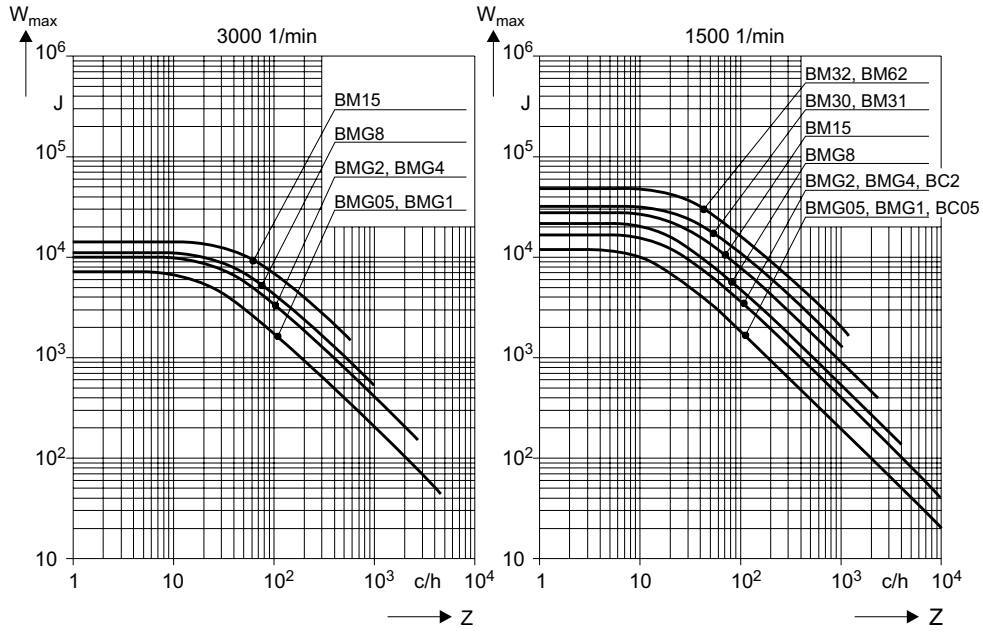


Figure 6: Maximum permitted work done per cycle at 3000 and 1500 min^{-1}

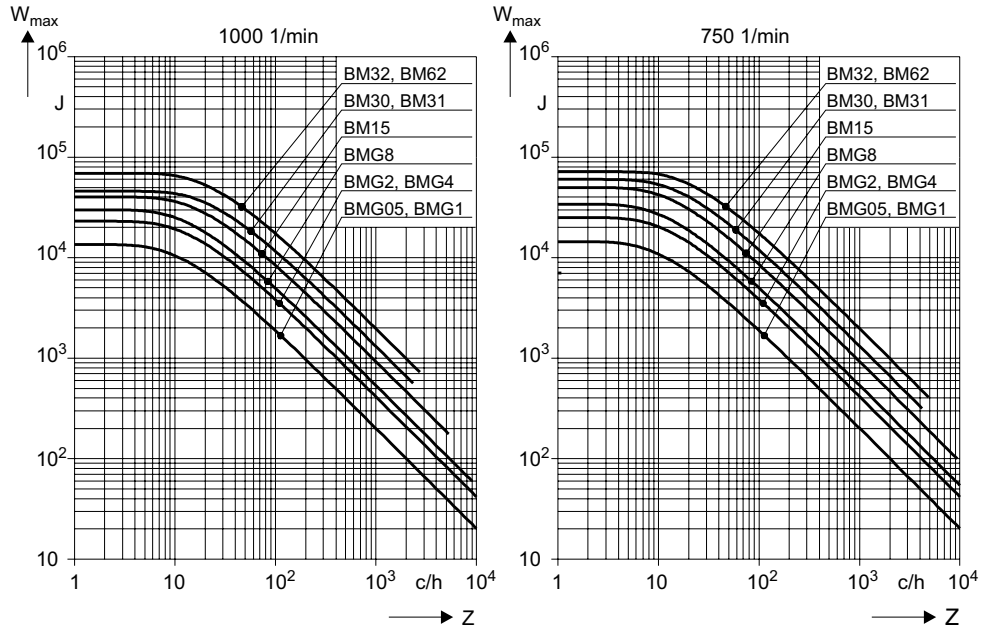


Figure 7: Maximum permitted work done per cycle at 1000 and 750 min^{-1}

10.3.2 Category II3G (BMG 05 - BM 62)

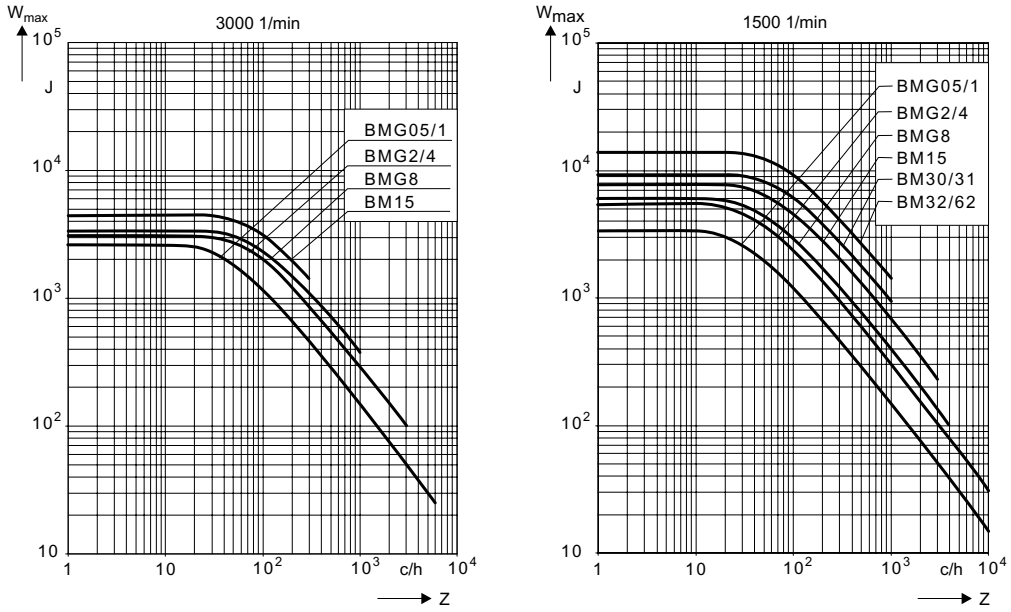


Figure 8: Maximum permitted work done per cycle at 3000 and 1500 min^{-1}

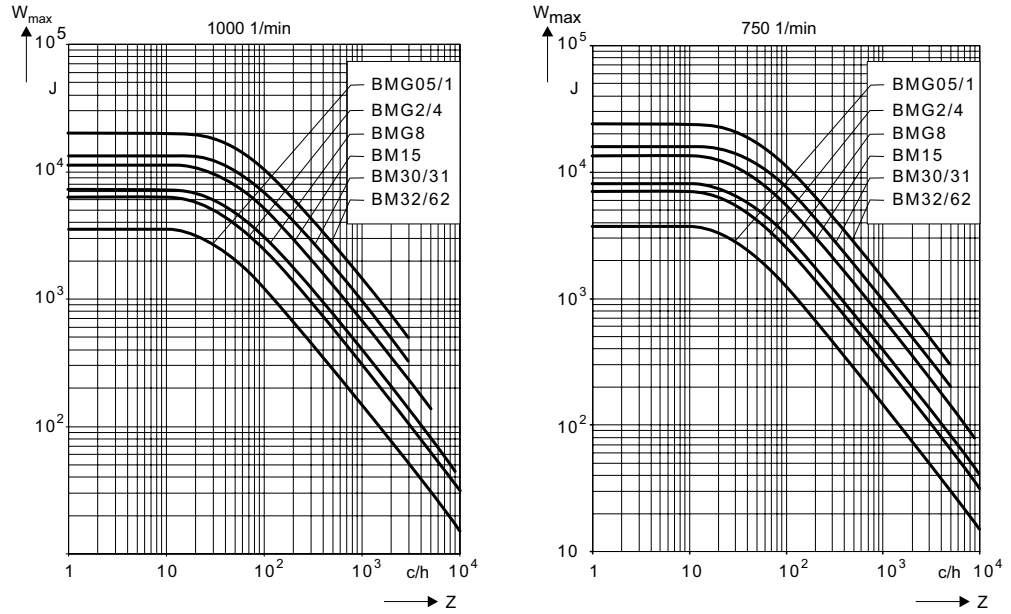


Figure 9: Maximum permitted work done per cycle at 1000 and 750 min^{-1}

10.4 Operating currents

The current values I_H (holding current) specified in the tables are r.m.s. values. Use only units to measure the r.m.s. values. The inrush current (accelerator current) I_B only flows for a short time (max. 150 ms) when the brake is released or during voltage dips below 70 % of the rated voltage. There is no increased inrush current if the BG brake rectifier is used or if there is a direct DC voltage supply - both are only possible with brakes up to motor size BMG4.

10.4.1 BMG 05 - BMG 4 brake

	BMG05	BMG1	BMG2	BMG4
Motor size	71/80	80	90/100	100
Max. braking torque [Nm]	5	10	20	40
Braking power [W]	32	36	40	50
Inrush current ratio I_B/I_H	4	4	4	4

Rated voltage V_N		BMG05		BMG 1		BMG 2		BMG 4	
V_{AC}	V_{DC}	I_H [A_{AC}]	I_G [A_{DC}]	I_H [A_{AC}]	I_G [A_{DC}]	I_H [A_{AC}]	I_G [A_{DC}]	I_H [A_{AC}]	I_G [A_{DC}]
	24		1.38		1.54		1.77		2.20
24 (23-25)	**10**	2.0	3.3	2.4	3.7	-	-	-	-
42 (40-46)	**18**	1.14	1.74	1.37	1.94	1.46	2.25	1.80	2.80
48 (47-52)	**20**	1.02	1.55	1.22	1.73	1.30	2.00	1.60	2.50
56 (53-58)	**24**	0.90	1.38	1.09	1.54	1.16	1.77	1.43	2.20
60 (59-66)	**27**	0.81	1.23	0.97	1.37	1.03	1.58	1.27	2.00
73 (67-73)	**30**	0.72	1.10	0.86	1.23	0.92	1.41	1.14	1.76
77 (74-82)	**33**	0.64	0.98	0.77	1.09	0.82	1.25	1.00	1.57
88 (83-92)	**36**	0.57	0.87	0.69	0.97	0.73	1.12	0.90	1.40
97 (93-104)	**40**	0.51	0.78	0.61	0.87	0.65	1.00	0.80	1.25
110 (105-116)	**48**	0.45	0.69	0.54	0.77	0.58	0.90	0.72	1.11
125 (117-131)	**52**	0.40	0.62	0.48	0.69	0.52	0.80	0.64	1.00
139 (132-147)	**60**	0.36	0.55	0.43	0.61	0.46	0.70	0.57	0.88
153 (148-164)	**66**	0.32	0.49	0.39	0.55	0.41	0.63	0.51	0.79
175 (165-185)	**72**	0.29	0.44	0.34	0.49	0.37	0.56	0.45	0.70
200 (186-207)	**80**	0.26	0.39	0.31	0.43	0.33	0.50	0.40	0.62
230 (208-233)	**96**	0.23	0.35	0.27	0.39	0.29	0.44	0.36	0.56
240 (234-261)	**110**	0.20	0.31	0.24	0.35	0.26	0.40	0.32	0.50
290 (262-293)	**117**	0.18	0.28	0.22	0.31	0.23	0.35	0.29	0.44
318 (294-329)	**125**	0.16	0.25	0.19	0.27	0.21	0.31	0.25	0.39
346 (330-369)	**147**	0.14	0.22	0.17	0.24	0.18	0.28	0.23	0.35
400 (370-414)	**167**	0.13	0.20	0.15	0.22	0.16	0.25	0.20	0.31
440 (415-464)	**185**	0.11	0.17	0.14	0.19	0.15	0.22	0.18	0.28
500 (465-522)	**208**	0.10	0.15	0.12	0.17	0.13	0.20	0.16	0.25

I_B Accelerator current - brief inrush current
I_H Holding current r.m.s. value in the supply cable to the SEW brake rectifier
I_G Direct current with direct DC voltage supply
V_N Rated voltage (rated voltage range)

10.4.2 BMG 8 - BM 32/62 brake

	BMG8	BM 15	BM30/31; BM32/62
Motor size	112/132S	132M-160M	160L-225
Max. braking torque [Nm]	75	150	600
Braking power [W]	65	95	120
Inrush current ratio I_B/I_H	6.3	7.5	8.5

Rated voltage V_N		BMG8	BM 15	BM 30/31; BM 32/62
V_{AC}	V_{DC}	I_H [A_{AC}]	I_H [A_{AC}]	I_H [A_{AC}]
	24	2.77[1)]	4.15[1)]	4.00[1)]
42 (40-46)	**-**	2.31	3.35	-
48 (47-52)	**-**	2.10	2.95	-
56 (53-58)	**-**	1.84	2.65	-
60 (59-66)	**-**	1.64	2.35	-
73 (67-73)	**-**	1.46	2.10	-
77 (74-82)	**-**	1.30	1.87	-
88 (83-92)	**-**	1.16	1.67	-
97 (93-104)	**-**	1.04	1.49	-
110 (105-116)	**-**	0.93	1.32	1.78
125 (117-131)	**-**	0.82	1.18	1.60
139 (132-147)	**-**	0.73	1.05	1.43
153 (148-164)	**-**	0.66	0.94	1.27
175 (165-185)	**-**	0.59	0.84	1.13
200 (186-207)	**-**	0.52	0.74	1.00
230 (208-233)	**-**	0.46	0.66	0.90
240 (234-261)	**-**	0.41	0.59	0.80
290 (262-293)	**-**	0.36	0.53	0.71
318 (294-329)	**-**	0.33	0.47	0.63
346 (330-369)	**-**	0.29	0.42	0.57
400 (370-414)	**-**	0.26	0.37	0.50
440 (415-464)	**-**	0.24	0.33	0.44
500 (465-522)	**-**	0.20	0.30	0.40

1) Direct current for operation with BSG

Key

I_H Holding current r.m.s. value in the supply cable to the SEW brake rectifier
I_B Accelerator current - brief inrush current
I_G Direct current with direct DC voltage supply
V_N Rated voltage (rated voltage range)

10.4.3 BC brake

	BC05	BC2
Motor size	71/80	90/100
Max. braking torque [Nm]	7.5	30
Braking power [W]	29	41
Control factor I_B/I_H	4	4

Rated voltage V_N		BC05		BC2	
V_{AC}	V_{DC}	I_H [A_{AC}]	I_G [A_{DC}]	I_H [A_{AC}]	I_G [A_{DC}]
	24	-	1.22	-	1.74
42 (40-46)	**18**	1.10	1.39	1.42	2.00
48 (47-52)	**20**	0.96	1.23	1.27	1.78
56 (53-58)	**24**	0.86	1.10	1.13	1.57
60 (59-66)	**27**	0.77	0.99	1.00	1.42
73 (67-73)	**30**	0.68	0.87	0.90	1.25
77 (74-82)	**33**	0.60	0.70	0.79	1.12
88 (83-92)	**36**	0.54	0.69	0.71	1.00
97 (93-104)	**40**	0.48	0.62	0.63	0.87
110 (105-116)	**48**	0.42	0.55	0.57	0.79
125 (117-131)	**52**	0.38	0.49	0.50	0.71
139 (132-147)	**60**	0.34	0.43	0.45	0.62
153 (148-164)	**66**	0.31	0.39	0.40	0.56
175 (165-185)	**72**	0.27	0.34	0.35	0.50
200 (186-207)	**80**	0.24	0.31	0.31	0.44
230 (208-233)	**96**	0.21	0.27	0.28	0.40
240 (234-261)	**110**	0.19	0.24	0.25	0.35
290 (262-293)	**117**	0.17	0.22	0.23	0.32
318 (294-329)	**125**	0.15	0.20	0.19	0.28
346 (330-369)	**147**	0.13	0.18	0.18	0.24
400 (370-414)	**167**	0.12	0.15	0.15	0.22
440 (415-464)	**185**	0.11	0.14	0.14	0.20
500 (465-522)	**208**	0.10	0.12	0.12	0.17

Key

I_H Holding current r.m.s. value in the supply cable to the SEW-EURODRIVE brake rectifier
I_B Accelerator current - brief inrush current
I_G Direct current with direct DC voltage supply
V_N Rated voltage (rated voltage range)

10.5 Maximum permitted overhung loads

The following table lists the permitted overhung loads (top value) and axial forces (bottom value) of explosion-proof AC motors:

Mounting position	[1/min] No. of poles	Permitted overhung load F_R [N] Permitted axial load F_A [N]; $F_{A_tensile\ force} = F_{A_pressure}$ Size													
		63	71	80	90	100	112	132S	132ML 132M	160M	160L	180	200	225	250 280
Foot mounted motor	750	-	680	920	1280	1700	1750	1900	2600	3600	3800	5600	6000	-	-
	8	-	200	240	320	400	480	560	640	960	960	1280	2000	-	-
	1000	-	640	840	1200	1520	1600	1750	2400	3300	3400	5000	5500	-	8000
	6	-	160	200	240	320	400	480	560	800	800	1120	1900	-	2500
	1500	-	560	720	1040	1300	1400	1500	2000	2600	3100	4500	4700	7000	8000
	4	-	120	160	210	270	270	270	400	640	640	940	2400	2400	2500
	3000	-	400	520	720	960	980	1100	1450	2000	2300	3450	-	-	-
	2	-	80	100	145	190	200	210	320	480	480	800	-	-	-
Flange-mounted motor	750	-	850	1150	1600	2100	2200	2400	3200	4600	4800	7000	7500	-	-
	8	-	250	300	400	500	600	700	800	1200	1200	1600	2500	-	-
	1000	600	800	1050	1500	1900	2000	2200	2900	4100	4300	6300	6800	-	11000
	6	150	200	250	300	400	500	600	700	1000	1000	1400	2400	-	3000
	1500	500	700	900	1300	1650	1750	1900	2500	3200	3900	5600	5900	8700	9000
	4	110	140	200	250	350	350	350	500	800	800	1200	3000	3000	2600
	3000	400	500	650	900	1200	1200	1300	1800	2500	2900	4300	-	-	-
	2	70	100	130	180	240	250	260	400	600	600	1000	-	-	-

10.5.1 Overhung load conversion for off-center force application

The permitted overhung loads must be calculated using the following formulae in the event that force is not applied at the center of the shaft end. The smaller of the two values F_{xL} (according to bearing service life) and F_{xW} (according to shaft strength) is the permitted value for the overhung load at point x. Note that the calculations apply to $M_{a\ max}$.

FxL based on bearing service life

$$F_{xL} = F_R \times \frac{a}{b + x}[N]$$

FxW based on shaft strength

$$F_{xW} = \frac{c}{f + x}[N]$$

F_R = Permitted overhung load (x = l/2) [N]
x = Distance from the shaft shoulder to the force application point in [mm]
a, b, f = Motor constants for overhung load conversion [mm]
c = Motor constant for overhung load conversion [Nmm]

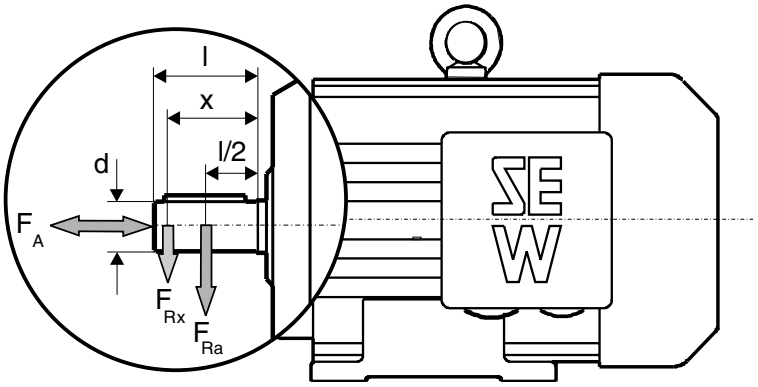


Figure 10: Overhung load F_X for off-center force applications

Motor constants for overhung load conversion

Size	a [mm]	b [mm]	c 2-pole [Nmm]	c 4-pole [Nmm]	c 6-pole [Nmm]	c 8-pole [Nmm]	f [mm]	d [mm]	l [mm]
DFR63	161	146	$11.2 \cdot 10^3$	$16.8 \cdot 10^3$	$19 \cdot 10^3$	-	13	14	30
DT71	158.5	143.8	$11.4 \cdot 10^3$	$16 \cdot 10^3$	$18.3 \cdot 10^3$	$19.5 \cdot 10^3$	13.6	14	30
DT80	213.8	193.8	$17.5 \cdot 10^3$	$24.2 \cdot 10^3$	$28.2 \cdot 10^3$	$31 \cdot 10^3$	13.6	19	40
(S)DT90	227.8	202.8	$27.4 \cdot 10^3$	$39.6 \cdot 10^3$	$45.7 \cdot 10^3$	$48.7 \cdot 10^3$	13.1	24	50
SDT100	270.8	240.8	$42.3 \cdot 10^3$	$57.3 \cdot 10^3$	$67 \cdot 10^3$	$75 \cdot 10^3$	14.1	28	60
DV100	270.8	240.8	$42.3 \cdot 10^3$	$57.3 \cdot 10^3$	$67 \cdot 10^3$	$75 \cdot 10^3$	14.1	28	60
(S)DV112M	286.8	256.8	$53 \cdot 10^3$	$75.7 \cdot 10^3$	$86.5 \cdot 10^3$	$94.6 \cdot 10^3$	24.1	28	60
(S)DV132S	341.8	301.8	$70.5 \cdot 10^3$	$96.1 \cdot 10^3$	$112 \cdot 10^3$	$122 \cdot 10^3$	24.1	38	80
DV132M	344.5	304.5	$87.1 \cdot 10^3$	$120 \cdot 10^3$	$144 \cdot 10^3$	$156 \cdot 10^3$	20.1	38	80
DV132ML	404.5	364.5	$120 \cdot 10^3$	$156 \cdot 10^3$	$198 \cdot 10^3$	$216.5 \cdot 10^3$	20.1	38	80
DV160M	419.5	364.5	$150 \cdot 10^3$	$195.9 \cdot 10^3$	$248 \cdot 10^3$	$270 \cdot 10^3$	20.1	42	110
DV160L	435.5	380.5	$177.5 \cdot 10^3$	$239 \cdot 10^3$	$262.5 \cdot 10^3$	$293 \cdot 10^3$	22.15	42	110
DV180	507.5	452.5	$266 \cdot 10^3$	$347 \cdot 10^3$	$386 \cdot 10^3$	$432 \cdot 10^3$	22.15	48	110
DV200	537.5	482.5	-	$258.5 \cdot 10^3$	$302.5 \cdot 10^3$	$330 \cdot 10^3$	0	55	110
DV225	626.5	556.5	-	$490 \cdot 10^3$	-	-	0	60	140
DV250	658	588	-	$630 \cdot 10^3$	-	-	0	65	140
DV280	658	588	-	$630 \cdot 10^3$	-	-	0	75	140

Second motor shaft end

Contact SEW-EURODRIVE regarding permitted load for 2nd motor shaft end.

10.6 Permitted ball bearing types

10.6.1 Category 2

Motor type	Drive-end bearing (AC motor, brakemotor)		Non drive-end bearing (foot-mounted, flange-mounted, gear-motors)	
	Gearmotor	Flange-mounted and foot-mounted motors	AC motor	Brakemotor
eDT71 - eDT80	6303 2RS J C3	6204 2RS J C3	6203 2RS J C3	
eDT90 - eDV100	6306 2RS J C3		6205 2RS J C3	
eDV112 - eDV132S	6307 2RS J C3	6208 2RS J C3	6207 2RS J C3	-
eDV132M - eDV160M	6309 2RS J C3		6209 2RS J C3	-
eDV160L - eDV180L	6312 2RS J C3		6213 2RS J C3	-

10.6.2 Category 3

Motor type	Drive-end bearing (AC motor, brakemotor)		Non drive-end bearing (foot-mounted, flange-mounted, gear-motors)	
	Gearmotor	Flange-mounted and foot-mounted motors	AC motor	Brakemotor
DFR63	6303 2RS J C3	6203 2RS J C3	6202 2RS J C3	-
DT71 - DT80	6303 2RS J C3	6204 2RS J C3	6203 2RS J C3	
DT90 - DV100	6306 2RS J C3		6205 2RS J C3	
DV112 - DV132S	6307 2RS J C3	6208 2RS J C3	6207 2RS J C3	
DV132M - DV160M	6309 2RS J C3		6209 2RS J C3	
DV160L - DV180L	6312 2RS J C3		6213 2RS J C3	
DV200LS - DV225M	6314 2RS J C3		6314 2RS J C3	
DV250 - DV280M	6316 2RS J C3		6315 2RS J C3	

11 Declaration of Conformity

11.1 Motors / brakes in category 2G, series eDT, eDV and BC

EG-Konformitätserklärung

EC Declaration of Conformity
Déclaration de conformité CE

TÜV CERT DIN EN ISO 9001

SEW EURODRIVE

im Sinne der Richtlinie 94/9/EG, Anhang VIII **Nr.***/No/N°* **132.08**
according to EC Directive 94/9/EC, Appendix VIII
au sens de la directive CE 94/9/CE, Annexe VIII

SEW EURODRIVE GmbH & Co KG
Ernst-Blickle-Straße 42, D-76646 Bruchsal

erklärt in alleiniger Verantwortung die Konformität der folgenden Produkte:
declares under sole responsibility conformity of the following products:
déclare, sous sa seule responsabilité, que les produits :

Motoren und Bremsen	**eDT, eDV und BC**	**in Kategorie**	**2G**
Motors and brakes	*eDT, eDV and BC*	*in category*	*2G*
Moteurs et freins	*eDT, eDV et BC*	*de catégorie*	*2G*

mit der Richtlinie: ***94/9 EG***
with the directive: *94/9 EC*
respectent la directive : *94/9 CE*

angewandte harmonisierte Normen: **EN 50014:1999**
applicable harmonized standards: **EN 50018:1994**
Normes harmonisées appliquées : **EN 50019-1-1:1994**
EN 60034-1:2000

SEW-EURODRIVE hält folgende technische Dokumentationen zur Einsicht bereit:
SEW-EURODRIVE has the following documentation available for review:
SEW-EURODRIVE tient à disposition la documentation technique suivante pour consultation :

- Vorschriftsmäßige Bedienungsanleitung
- *Installation and operating instructions in conformance with applicable regulations*
- *Notice d'utilisation conforme aux prescriptions*

- Technische Bauunterlagen
- *Technical design documentation*
- *Dossier technique de construction*

Ort/Datum
Place/date / Lieu et date

Bruchsal, 28.05.2004

Geschäftsführer Vertrieb und Marketing
Managing Director Sales and Marketing
Directeur général international commercial et marketing

H. Sondermann

11.2 Motors in category 3GD, series eDT / eDV

EG-Konformitätserklärung

EC Declaration of Conformity
Déclaration de conformité CE

TÜV CERT DIN EN ISO 9001

SEW EURODRIVE

Nr./*No*/*N°* **900130007**

SEW EURODRIVE GmbH & Co KG
Ernst-Blickle-Straße 42, D-76646 Bruchsal

erklärt in alleiniger Verantwortung die Konformität der folgenden Produkte
declares under sole responsibility conformity of the following products
déclare, sous sa seule responsabilité, la conformité des produits mentionnés ci-après

Motoren und Bremsmotoren der Baureihe: *Motors and break motors of the series:* *Moteurs et moteurs-frein des séries:*	**DR63** **DT** **DV**
Kategorie: *in category: / de catégories:*	**II 3G & II3D & II 3GD**
Kennzeichnung: *marking: / identificateur:*	**II3G Ex nA II T3** **II3G Ex nA II T4** **II3D Ex tD A22 IP5X T120°C** **II3D Ex tD A22 IP6X T120°C**
mit der *with the / respetent la*	
Richtlinie *Directive / Directive*	**94/9 EG** *94/9 EC / 94/9CE*
EMV-Richtlinie *EMC Directive / Directive CEM*	**89/336 EG** *89/336 EC / 89/336 CE*
angewandte harmonisierte Normen: *applied harmonized standards / Normes harmonisées appliquées*	
	EN 60079-0:2004
	EN 60079-15:2003
	prEN 61241-0:2002
	EN 61241-1:2004
	EN 60034-1:1998/A11:2002

Ort/Datum
Place/date / Lieu et date

Bruchsal, 01.02.07

Geschäftsführer Vertrieb und Marketing
Managing Director Sales and Marketing
Directeur général international commercial et marketing

H. Sondermann

11.3 Motors / brakemotors in category 2GD and 2G

EG-Konformitätserklärung

EC Declaration of Conformity
Déclaration de conformité CE

TÜV CERT DIN EN ISO 9001

SEW EURODRIVE

Nr./*No/N°* 900120007

SEW EURODRIVE GmbH & Co KG
Ernst-Blickle-Straße 42, D-76646 Bruchsal

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declares under sole responsibility conformity of the following products
déclare, sous sa seule responsabilité, la conformité des produits mentionnés ci-après

Motoren der Baureihe: *Motors of the series:* *Moteurs des séries:*	**eDT** **eDV**
Kategorie: *category: / catégories:*	**II 2G & II 2GD**
Kennzeichnung: *marking: / identificateur:*	**II2G Ex e II T3** **II2G Ex e II T4** **II2G Ex ed IIB T3** **II2D Ex tD A21 IP6X T120°C**
mit der *with the / respetent la*	
Richtlinie *Directive / Directive*	**94/9 EG** *94/9 EC / 94/9CE*
EMV-Richtlinie *EMC Directive / Directive CEM*	**89/336 EG** *89/336 EC / 89/336 CE*
angewandte harmonisierte Normen: *applied harmonized standards / Normes harmonisées appliquées*	
	EN 60079-7:2003
	EN 60079-0:2004
	prEN 61241-0:2002
	EN 61241-1:2004
	EN 60034-1:1998/A11:2002

Ort/Datum *Place/date / Lieu et date*	**Geschäftsführer Vertrieb und Marketing** *Managing Director Sales and Marketing* *Directeur général international commercial et marketing*
Bruchsal, 01.02.07	H. Sondermann

11.4 Motors / brakemotors in category 3D, series CT / CV

EG-Konformitätserklärung

EC Declaration of Conformity
Déclaration de conformité CE

TÜV CERT DIN EN ISO 9001

SEW EURODRIVE

Nr./*No/N°* 900140007

SEW EURODRIVE GmbH & Co KG
Ernst-Blickle-Straße 42, D-76646 Bruchsal

erklärt in alleiniger Verantwortung die Konformität der folgenden Produkte
declares under sole responsibility conformity of the following products
déclare, sous sa seule responsabilité, la conformité des produits mentionnés ci-après

Motoren und Bremsmotoren der Baureihe: *Motors and break motors of the series:* *Moteurs et moteurs-frein des séries:*	**CT** **CV**
Kategorie: *category: / categorie:*	**II 3D**
Kennzeichnung: *marking: / identificateur:*	**II3D Ex tD A22 IP5X T140°C** **II3D Ex tD A22 IP6X T140°C**
mit der *with the / respetent la*	
Richtlinie *Directive / Directive*	**94/9 EG** *94/9 EC / 94/9CE*
EMV-Richtlinie *EMC Directive / Directive CEM*	**89/336 EG** *89/336 EC / 89/336 CE*
angewandte harmonisierte Normen: *applied harmonized standards / Normes harmonisées appliquées*	
	EN 61241-1:2004
	prEN 61241-0:2002
	EN 60034-1:1998/A11:2002

Ort/Datum
Place/date / Lieu et date

Bruchsal, 01.02.07

Geschäftsführer Vertrieb und Marketing
Managing Director Sales and Marketing
Directeur général international commercial et marketing

H. Sondermann

11.5 Motors / brakemotors in category 2G, series eDR

EG-Konformitätserklärung

EC Declaration of Conformity
Déclaration de conformité CE

TÜV CERT DIN EN ISO 9001

SEW EURODRIVE

im Sinne der Richtlinie 94/9/EG, Anhang VIII **Nr.**/*No*/*N°* **137.02**
according to EC Directive 94/9/EC, Appendix VIII
au sens de la directive CE 94/9/CE, Annexe VIII

SEW EURODRIVE GmbH & Co KG
Ernst-Blickle-Straße 42, D-76646 Bruchsal

erklärt in alleiniger Verantwortung die Konformität der folgenden Produkte:
declares under sole responsibility conformity of the following products:
déclare, sous sa seule responsabilité, que les produits :

Motoren	**eDR, in Kategorie 2G**
Motors	*eDR, in category 2G*
Moteurs	*eDR, de catégorie 2G*

mit der Richtlinie:	***94/9 EG***
with the directive:	*94/9 EC*
respectent la directive :	*94/9 CE*
angewandte harmonisierte Normen:	**EN 50014: 1999**
applicable harmonized standards:	**EN 50019: 2000**
Normes harmonisées appliquées :	**EN 60034-1: 2000**

SEW-EURODRIVE hält folgende technische Dokumentationen zur Einsicht bereit:
SEW-EURODRIVE has the following documentation available for review:
SEW-EURODRIVE tient à disposition la documentation technique suivante pour consultation :

- Vorschriftsmäßige Bedienungsanleitung
- *Installation and operating instructions in conformance with applicable regulations*
- *Notice d'utilisation conforme aux prescriptions*

- Technische Bauunterlagen
- *Technical design documentation*
- *Dossier technique de construction*

Ort/Datum
Place/date / Lieu et date

Bruchsal, 28.05.2004

Geschäftsführer Vertrieb und Marketing
Managing Director Sales and Marketing
Directeur général international commercial et marketing

H. Sondermann

11.6 Motors / brakemotors in category 2D, series eDT / eDV

EG-Konformitätserklärung

EC Declaration of Conformity
Déclaration de conformité CE

TÜV CERT DIN EN ISO 9001 — SEW EURODRIVE

im Sinne der Richtlinie 94/9/EG, Anhang VIII **Nr.**/*No*/*N°* **133.09**
according to EC Directive 94/9/EC, Appendix VIII
au sens de la directive CE 94/9/CE, Annexe VIII

SEW EURODRIVE GmbH & Co KG
Ernst-Blickle-Straße 42, D-76646 Bruchsal

erklärt in alleiniger Verantwortung die Konformität der folgenden Produkte:
declares under sole responsibility conformity of the following products:
déclare, sous sa seule responsabilité, que les produits :

Motoren	**eDT, eDV**	**in Kategorie**	**2D**
Motors	*eDT, eDV*	*in category*	*2D*
Moteurs	*eDT, eDV*	*de catégorie*	*2D*

mit der Richtlinie: ***94/9 EG***
with the directive: *94/9 EC*
respectent la directive : *94/9 CE*

angewandte harmonisierte Normen: **EN 50014:1999**
applicable harmonized standards: **EN 50281-1-1:1998**
Normes harmonisées appliquées : **EN 60034-1:2000**

SEW-EURODRIVE hält folgende technische Dokumentationen zur Einsicht bereit:
SEW-EURODRIVE has the following documentation available for review:
SEW-EURODRIVE tient à disposition la documentation technique suivante pour consultation :

- Vorschriftsmäßige Bedienungsanleitung
- *Installation and operating instructions in conformance with applicable regulations*
- *Notice d'utilisation conforme aux prescriptions*

- Technische Bauunterlagen
- *Technical design documentation*
- *Dossier technique de construction*

Ort/Datum
Place/date / Lieu et date

Bruchsal, 28.05.2004

Geschäftsführer Vertrieb und Marketing
Managing Director Sales and Marketing
Directeur général international commercial et marketing

H. Sondermann

12 Appendix

12.1 Operating and maintenance instructions for WISTRO forced cooling fan

OPERATION AND MAINTENANCE MANUAL
DUST EXPLOSION PROTECTION WISTRO SEPARATELY DRIVEN FAN AGGREGATE
MODEL IL ATEX 3D
betriebs.und.wartungsanleitung.d_ATEX.3D

WISTRO-Separately driven fan aggregate (FLA) in accordance with EU Guidelines 94/9 (type and related norms, see EU conformity declaration) are usually supplied pre-finished. The bearings are designed to be maintenance free for a lifespan of 40,000 operating hours.
With operating times longer than this, the FLA should be replaced with a new unit.

Protect class IP66 in accordance with EN 60529, max. permissible surface temperature is 120^C

The appropriate safety provisions regarding protection against contact with moving parts (DIN EN 294) have been fulfilled.

Before installation, ensure that the fan wheel can rotate smoothly and that the fan blades are neither deformed nor bent. This can lead to imbalances, which can have a negative effect on lifespan.

The electrical connection is dependent on operating mode (one-phase or three-phase) according to the connection plan (Appendix 1). The connection schematic is also engraved or glued to the terminal box lid.
The FLA must be protected with the integrated PTC and a suitable relay.
They may be monitored thermally as sole protection with the integrated PTC in conjunction with a suitable relay.
The max. permissible currents are listed in the table "Current usage range – IL Model" (Appendix 2).
The cable guide opening is protected by a sealing plug at the factory. An ATEX-compatible screwed cable gland should be used for the connection. The diameter of the connection cable should match the size of cable gland.

After installation and electrical connection, carry out a test run. In doing so, ensure that the rotational direction of the fan wheel matches the directional arrow on the interior of the air intake grate and so blows over the motor to be cooled.
Attention: If the rotational direction is incorrect, cooling power is reduced significantly. There is a risk that the machine component to be cooled may overheat.

In operation ensure, particularly in dusty atmospheres, that excessive dust residue does not build up on the fan blades, because this can also lead to imbalances, which reduce lifespan. This also applies to particulate atmospheres, such as in the woodworking industry or coal pulverising. A canopy is recommended for these or similar situations.
Canopies may also easily be mounted retrospectively, by loosening the four flange bolts (instar bolts), inserting the fastening angle and tightening the bolts again.
Retroactive mounting of a canopy must be carried out by properly qualified personnel and be appraised and documented by a qualified person.
When replacing the fan wheel, due to damage or destruction, only an ATEX-compliant fan wheel made from conductive plastic may be used.

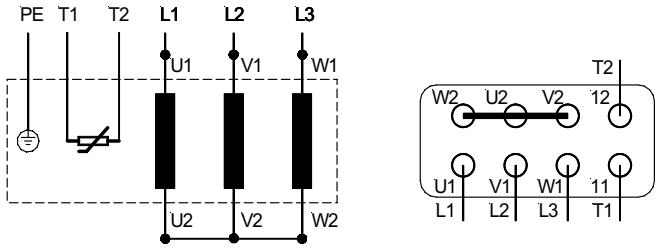
12.1.1 Wiring diagram for VE forced cooling fan (enclosure 1)

wistro

Electrical connection, IL 3 D series

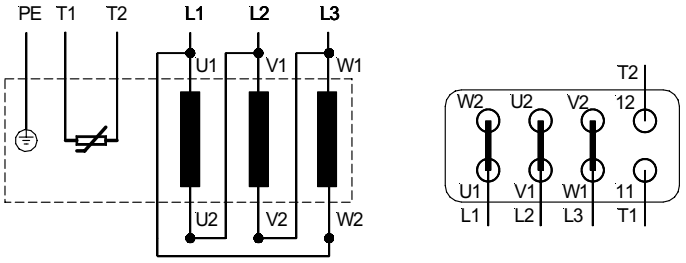
3~人

Star connection



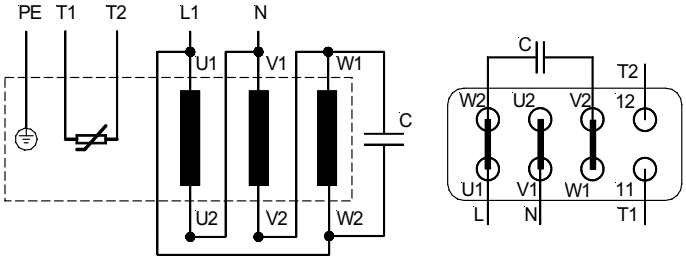
3~ △

Delta connection



1~ 丄(△)

Delta Steinmetz



U1 (T1) = black
U2 (T4) = green
V1 (T2) = light blue
V2 (T5) = white
W1 (T3) = brown
W2 (T6) = yellow

12.1.2 Voltage range for VE forced cooling fan (enclosure 2)

wistro

Range of operating voltage, type IL (in line with EN 60334)

Mode	Frame size	Blower diameter	Range of voltage		max. permissible current	max. power input
		(mm)	(V) 50Hz	60Hz	(A)	(W)
1~ ( )	63	118	230 – 277	230 – 277	0,11	38
	71	132	230 – 277	230 – 277	0,12	41
	80	150	230 – 277	230 – 277	0,13	44
	90	169	230 – 277	230 – 277	0,25	88
	100	187	230 – 277	230 – 277	0,28	88
	112	210	230 – 277	230 – 277	0,31	107
	132	250	230 – 277	230 – 277	0,59	185
	160–200	300	230 – 277	————	0,93	225
3~ Y	63	118	380 – 500	380 – 575	0,06	32
	71	132	380 – 500	380 – 575	0,06	33
	80	156	380 – 500	380 – 575	0,06	34
	90	169	380 – 500	380 – 575	0,16	90
	100	187	380 – 500	380 – 575	0,16	93
	112	210	380 – 500	380 – 575	0,16	94
	132	250	380 – 500	380 – 575	0,24	148
	160–200	300	380 – 500	380 – 575	0,51	280
3~	63	118	220 – 290	220 – 332	0,10	32
	71	132	220 – 290	220 – 332	0,10	33
	80	156	220 – 290	220 – 332	0,10	34
	90	169	220 – 290	220 – 332	0,28	90
	100	187	220 – 290	220 – 332	0,28	93
	112	210	220 – 290	220 – 332	0,28	94
	132	250	220 – 290	220 – 332	0,45	148
	160–200	300	220 – 290	220 – 332	0,85	280

bipolar

12.1.3 EC Declaration of Conformity: Forced cooling fan VE

wistro

EG-Konformitätserklärung
EC-Declaration of Confirmity
atex_kategorie.3D_20.10.2003

Produkt: Fremdlüftungsaggregate IL 3D der Gerätgruppe II, Kategorie 3D
Typ B20-..-..IL/…… bis Typ C60-..-IL/……

WISTRO erklärt die Übereinstimmung des o.a. Produktes mit
Folgenden Richtlinien: 94/9/EG

Angewandte Normen: EN 60034, EN 50281-1-1, EN 50014

WISTRO trägt für die Ausstellung dieser EG-Konformitätserklärung die alleinige Verantwortung. Die Erklärung ist keine Zusicherung im Sinne der Produkthaftung.

Product: Forced ventilation units IL 3D of group II, category 3D
Typ B20.--.—IL/…… to typ C60-..-.. IL/……

WISTRO herewith declares the conformity of a. m. product with
following directive: 94/9/EC

Applied standards: EN 60034, EN 50281-1-1, EN 50014

WISTRO has the sole responsibility for issuing this EC declaration of conformity.
This declaration is not an assurance as defined by product liability.

Langenhagen, 21.10.2003

Geschäftsführer (W.Strohmeyer)
General Manager

13 Address List

Germany			
Headquarters **Production** **Sales**	**Bruchsal**	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 42 D-76646 Bruchsal P.O. Box Postfach 3023 • D-76642 Bruchsal	Tel. +49 7251 75-0 Fax +49 7251 75-1970 http://www.sew-eurodrive.de sew@sew-eurodrive.de
Service Competence Center	**Central**	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 1 D-76676 Graben-Neudorf	Tel. +49 7251 75-1710 Fax +49 7251 75-1711 sc-mitte@sew-eurodrive.de
	North	SEW-EURODRIVE GmbH & Co KG Alte Ricklinger Straße 40-42 D-30823 Garbsen (near Hannover)	Tel. +49 5137 8798-30 Fax +49 5137 8798-55 sc-nord@sew-eurodrive.de
	East	SEW-EURODRIVE GmbH & Co KG Dänkritzer Weg 1 D-08393 Meerane (near Zwickau)	Tel. +49 3764 7606-0 Fax +49 3764 7606-30 sc-ost@sew-eurodrive.de
	South	SEW-EURODRIVE GmbH & Co KG Domagkstraße 5 D-85551 Kirchheim (near München)	Tel. +49 89 909552-10 Fax +49 89 909552-50 sc-sued@sew-eurodrive.de
	West	SEW-EURODRIVE GmbH & Co KG Siemensstraße 1 D-40764 Langenfeld (near Düsseldorf)	Tel. +49 2173 8507-30 Fax +49 2173 8507-55 sc-west@sew-eurodrive.de
	Electronics	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 42 D-76646 Bruchsal	Tel. +49 7251 75-1780 Fax +49 7251 75-1769 sc-elektronik@sew-eurodrive.de
	Drive Service Hotline / 24 Hour Service		+49 180 5 SEWHELP +49 180 5 7394357
	Additional addresses for service in Germany provided on request!		

France			
Production **Sales** **Service**	**Haguenau**	SEW-USOCOME 48-54, route de Soufflenheim B. P. 20185 F-67506 Haguenau Cedex	Tel. +33 3 88 73 67 00 Fax +33 3 88 73 66 00 http://www.usocome.com sew@usocome.com
Production	**Forbach**	SEW-EUROCOME Zone Industrielle Technopôle Forbach Sud B. P. 30269 F-57604 Forbach Cedex	Tel. +33 3 87 29 38 00
Assembly **Sales** **Service**	**Bordeaux**	SEW-USOCOME Parc d'activités de Magellan 62, avenue de Magellan - B. P. 182 F-33607 Pessac Cedex	Tel. +33 5 57 26 39 00 Fax +33 5 57 26 39 09
	Lyon	SEW-USOCOME Parc d'Affaires Roosevelt Rue Jacques Tati F-69120 Vaulx en Velin	Tel. +33 4 72 15 37 00 Fax +33 4 72 15 37 15
	Paris	SEW-USOCOME Zone industrielle 2, rue Denis Papin F-77390 Verneuil l'Etang	Tel. +33 1 64 42 40 80 Fax +33 1 64 42 40 88
	Additional addresses for service in France provided on request!		

Algeria			
Sales	**Alger**	Réducom 16, rue des Frères Zaghnoun Bellevue El-Harrach 16200 Alger	Tel. +213 21 8222-84 Fax +213 21 8222-84 reducom_sew@yahoo.fr

Argentina			
Assembly **Sales** **Service**	**Buenos Aires**	SEW EURODRIVE ARGENTINA S.A. Centro Industrial Garin, Lote 35 Ruta Panamericana Km 37,5 1619 Garin	Tel. +54 3327 4572-84 Fax +54 3327 4572-21 sewar@sew-eurodrive.com.ar

Australia			
Assembly **Sales** **Service**	**Melbourne**	SEW-EURODRIVE PTY. LTD. 27 Beverage Drive Tullamarine, Victoria 3043	Tel. +61 3 9933-1000 Fax +61 3 9933-1003 http://www.sew-eurodrive.com.au enquires@sew-eurodrive.com.au
	Sydney	SEW-EURODRIVE PTY. LTD. 9, Sleigh Place, Wetherill Park New South Wales, 2164	Tel. +61 2 9725-9900 Fax +61 2 9725-9905 enquires@sew-eurodrive.com.au
	Townsville	SEW-EURODRIVE PTY. LTD. 12 Leyland Street Garbutt, QLD 4814	Tel. +61 7 4779 4333 Fax +61 7 4779 5333 enquires@sew-eurodrive.com.au

Austria			
Assembly **Sales** **Service**	**Wien**	SEW-EURODRIVE Ges.m.b.H. Richard-Strauss-Strasse 24 A-1230 Wien	Tel. +43 1 617 55 00-0 Fax +43 1 617 55 00-30 http://sew-eurodrive.at sew@sew-eurodrive.at

Belarus			
Sales	**Minsk**	SEW-EURODRIVE BY RybalkoStr. 26 BY-220033 Minsk	Tel.+375 (17) 298 38 50 Fax +375 (17) 29838 50 sales@sew.by

Belgium			
Assembly **Sales** **Service**	**Brüssel**	SEW Caron-Vector S.A. Avenue Eiffel 5 B-1300 Wavre	Tel. +32 10 231-311 Fax +32 10 231-336 http://www.sew-eurodrive.be info@caron-vector.be

Brazil			
Production **Sales** **Service**	**Sao Paulo**	SEW-EURODRIVE Brasil Ltda. Avenida Amâncio Gaiolli, 50 Caixa Postal: 201-07111-970 Guarulhos/SP - Cep.: 07251-250	Tel. +55 11 6489-9133 Fax +55 11 6480-3328 http://www.sew.com.br sew@sew.com.br
	Additional addresses for service in Brazil provided on request!		

Bulgaria			
Sales	**Sofia**	BEVER-DRIVE GmbH Bogdanovetz Str.1 BG-1606 Sofia	Tel. +359 2 9151160 Fax +359 2 9151166 bever@fastbg.net

Cameroon			
Sales	**Douala**	Electro-Services Rue Drouot Akwa B.P. 2024 Douala	Tel. +237 33 431137 Fax +237 33 431137

Canada			
Assembly **Sales** **Service**	**Toronto**	SEW-EURODRIVE CO. OF CANADA LTD. 210 Walker Drive Bramalea, Ontario L6T3W1	Tel. +1 905 791-1553 Fax +1 905 791-2999 http://www.sew-eurodrive.ca marketing@sew-eurodrive.ca
	Vancouver	SEW-EURODRIVE CO. OF CANADA LTD. 7188 Honeyman Street Delta. B.C. V4G 1 E2	Tel. +1 604 946-5535 Fax +1 604 946-2513 marketing@sew-eurodrive.ca
	Montreal	SEW-EURODRIVE CO. OF CANADA LTD. 2555 Rue Leger LaSalle, Quebec H8N 2V9	Tel. +1 514 367-1124 Fax +1 514 367-3677 marketing@sew-eurodrive.ca
	Additional addresses for service in Canada provided on request!		

Chile			
Assembly **Sales** **Service**	**Santiago de Chile**	SEW-EURODRIVE CHILE LTDA. Las Encinas 1295 Parque Industrial Valle Grande LAMPA RCH-Santiago de Chile P.O. Box Casilla 23 Correo Quilicura - Santiago - Chile	Tel. +56 2 75770-00 Fax +56 2 75770-01 http://www.sew-eurodrive.cl ventas@sew-eurodrive.cl

China			
Production **Assembly** **Sales** **Service**	**Tianjin**	SEW-EURODRIVE (Tianjin) Co., Ltd. No. 46, 7th Avenue, TEDA Tianjin 300457	Tel. +86 22 25322612 Fax +86 22 25322611 info@sew-eurodrive.cn http://www.sew-eurodrive.cn
Assembly **Sales** **Service**	**Suzhou**	SEW-EURODRIVE (Suzhou) Co., Ltd. 333, Suhong Middle Road Suzhou Industrial Park Jiangsu Province, 215021 P. R. China	Tel. +86 512 62581781 Fax +86 512 62581783 suzhou@sew-eurodrive.cn
	Guangzhou	SEW-EURODRIVE (Guangzhou) Co., Ltd. No. 9, JunDa Road East Section of GETDD Guangzhou 510530 P. R. China	Tel. +86 20 82267890 Fax +86 20 82267891 guangzhou@sew-eurodrive.cn
	Shenyang	SEW-EURODRIVE (Shenyang) Co., Ltd. 10A-2, 6th Road Shenyang Economic Technological Development Area Shenyang, 110141 P. R. China	Tel. +86 24 25382538 Fax +86 24 25382580 shenyang@sew-eurodrive.cn
	Additional addresses for service in China provided on request!		

Colombia			
Assembly **Sales** **Service**	**Bogotá**	SEW-EURODRIVE COLOMBIA LTDA. Calle 22 No. 132-60 Bodega 6, Manzana B Santafé de Bogotá	Tel. +57 1 54750-50 Fax +57 1 54750-44 http://www.sew-eurodrive.com.co sewcol@sew-eurodrive.com.co

Croatia			
Sales **Service**	**Zagreb**	KOMPEKS d. o. o. PIT Erdödy 4 II HR 10 000 Zagreb	Tel. +385 1 4613-158 Fax +385 1 4613-158 kompeks@net.hr

Czech Republic			
Sales	**Praha**	SEW-EURODRIVE CZ S.R.O. Business Centrum Praha Lužná 591 CZ-16000 Praha 6 - Vokovice	Tel. +420 220121234 Fax +420 220121237 http://www.sew-eurodrive.cz sew@sew-eurodrive.cz

Denmark			
Assembly **Sales** **Service**	**Kopenhagen**	SEW-EURODRIVEA/S Geminivej 28-30 DK-2670 Greve	Tel. +45 43 9585-00 Fax +45 43 9585-09 http://www.sew-eurodrive.dk sew@sew-eurodrive.dk

Egypt			
Sales **Service**	**Cairo**	Copam Egypt for Engineering & Agencies 33 El Hegaz ST, Heliopolis, Cairo	Tel. +20 2 22566-299 + 1 23143088 Fax +20 2 22594-757 http://www.copam-egypt.com/ copam@datum.com.eg

Estonia			
Sales	**Tallin**	ALAS-KUUL AS Reti tee 4 EE-75301 Peetri küla, Rae vald, Harjumaa	Tel. +372 6593230 Fax +372 6593231 veiko.soots@alas-kuul.ee

Finland			
Assembly **Sales** **Service**	**Lahti**	SEW-EURODRIVE OY Vesimäentie 4 FIN-15860 Hollola 2	Tel. +358 201 589-300 Fax +358 3 780-6211 sew@sew.fi http://www.sew-eurodrive.fi

Gabon			
Sales	**Libreville**	Electro-Services B.P. 1889 Libreville	Tel. +241 7340-11 Fax +241 7340-12

Great Britain			
Assembly **Sales** **Service**	**Normanton**	SEW-EURODRIVE Ltd. Beckbridge Industrial Estate P.O. Box No.1 GB-Normanton, West- Yorkshire WF6 1QR	Tel. +44 1924 893-855 Fax +44 1924 893-702 http://www.sew-eurodrive.co.uk info@sew-eurodrive.co.uk

Greece			
Sales **Service**	**Athen**	Christ. Boznos & Son S.A. 12, Mavromichali Street P.O. Box 80136, GR-18545 Piraeus	Tel. +30 2 1042 251-34 Fax +30 2 1042 251-59 http://www.boznos.gr info@boznos.gr

Hong Kong			
Assembly **Sales** **Service**	**Hong Kong**	SEW-EURODRIVE LTD. Unit No. 801-806, 8th Floor Hong Leong Industrial Complex No. 4, Wang Kwong Road Kowloon, Hong Kong	Tel. +852 2 7960477 + 79604654 Fax +852 2 7959129 contact@sew-eurodrive.hk

Hungary			
Sales **Service**	**Budapest**	SEW-EURODRIVE Kft. H-1037 Budapest Kunigunda u. 18	Tel. +36 1 437 06-58 Fax +36 1 437 06-50 office@sew-eurodrive.hu

India			
Assembly **Sales** **Service**	**Baroda**	SEW-EURODRIVE India Pvt. Ltd. Plot No. 4, Gidc Por Ramangamdi • Baroda - 391 243 Gujarat	Tel. +91 265 2831086 Fax +91 265 2831087 http://www.seweurodriveindia.com mdoffice@seweurodriveindia.com

Ireland			
Sales **Service**	**Dublin**	Alperton Engineering Ltd. 48 Moyle Road Dublin Industrial Estate Glasnevin, Dublin 11	Tel. +353 1 830-6277 Fax +353 1 830-6458 info@alperton.ie

Israel			
Sales	**Tel-Aviv**	Liraz Handasa Ltd. Ahofer Str 34B / 228 58858 Holon	Tel. +972 3 5599511 Fax +972 3 5599512 office@liraz-handasa.co.il

Italy			
Assembly **Sales** **Service**	**Milano**	SEW-EURODRIVE di R. Blickle & Co.s.a.s. Via Bernini,14 I-20020 Solaro (Milano)	Tel. +39 02 96 9801 Fax +39 02 96 799781 http://www.sew-eurodrive.it sewit@sew-eurodrive.it

Ivory Coast			
Sales	**Abidjan**	SICA Ste industrielle et commerciale pour l'Afrique 165, Bld de Marseille B.P. 2323, Abidjan 08	Tel. +225 2579-44 Fax +225 2584-36

Japan			
Assembly **Sales** **Service**	**Iwata**	SEW-EURODRIVE JAPAN CO., LTD 250-1, Shimoman-no, Iwata Shizuoka 438-0818	Tel. +81 538 373811 Fax +81 538 373814 http://www.sew-eurodrive.co.jp sewjapan@sew-eurodrive.co.jp

Korea			
Assembly **Sales** **Service**	**Ansan-City**	SEW-EURODRIVE KOREA CO., LTD. B 601-4, Banweol Industrial Estate 1048-4, Shingil-Dong Ansan 425-120	Tel. +82 31 492-8051 Fax +82 31 492-8056 http://www.sew-korea.co.kr master@sew-korea.co.kr
	Busan	SEW-EURODRIVE KOREA Co., Ltd. No. 1720 - 11, Songjeong - dong Gangseo-ku Busan 618-270	Tel. +82 51 832-0204 Fax +82 51 832-0230 master@sew-korea.co.kr

Latvia			
Sales	**Riga**	SIA Alas-Kuul Katlakalna 11C LV-1073 Riga	Tel. +371 7139253 Fax +371 7139386 http://www.alas-kuul.com info@alas-kuul.com

Lebanon			
Sales	**Beirut**	Gabriel Acar & Fils sarl B. P. 80484 Bourj Hammoud, Beirut	Tel. +961 1 4947-86 +961 1 4982-72 +961 3 2745-39 Fax +961 1 4949-71 gacar@beirut.com

Lithuania			
Sales	**Alytus**	UAB Irseva Naujoji 19 LT-62175 Alytus	Tel. +370 315 79204 Fax +370 315 56175 info@irseva.lt http://www.sew-eurodrive.lt

Luxembourg			
Assembly **Sales** **Service**	**Brüssel**	CARON-VECTOR S.A. Avenue Eiffel 5 B-1300 Wavre	Tel. +32 10 231-311 Fax +32 10 231-336 http://www.sew-eurodrive.lu info@caron-vector.be

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Assembly **Sales** **Service**	**Johore**	SEW-EURODRIVE SDN BHD No. 95, Jalan Seroja 39, Taman Johor Jaya 81000 Johor Bahru, Johor West Malaysia	Tel. +60 7 3549409 Fax +60 7 3541404 sales@sew-eurodrive.com.my

Mexico			
Assembly **Sales** **Service**	**Queretaro**	SEW-EURODRIVE MEXIKO SA DE CV SEM-981118-M93 Tequisquiapan No. 102 Parque Industrial Queretaro C.P. 76220 Queretaro, Mexico	Tel. +52 442 1030-300 Fax +52 442 1030-301 http://www.sew-eurodrive.com.mx scmexico@seweurodrive.com.mx

Morocco			
Sales	**Casablanca**	Afit 5, rue Emir Abdelkader MA 20300 Casablanca	Tel. +212 22618372 Fax +212 22618351 ali.alami@premium.net.ma

Netherlands			
Assembly **Sales** **Service**	**Rotterdam**	VECTOR Aandrijftechniek B.V. Industrieweg 175 NL-3044 AS Rotterdam Postbus 10085 NL-3004 AB Rotterdam	Tel. +31 10 4463-700 Fax +31 10 4155-552 http://www.vector.nu info@vector.nu

New Zealand			
Assembly **Sales** **Service**	**Auckland**	SEW-EURODRIVE NEW ZEALAND LTD. P.O. Box 58-428 82 Greenmount drive East Tamaki Auckland	Tel. +64 9 2745627 Fax +64 9 2740165 http://www.sew-eurodrive.co.nz sales@sew-eurodrive.co.nz
	Christchurch	SEW-EURODRIVE NEW ZEALAND LTD. 10 Settlers Crescent, Ferrymead Christchurch	Tel. +64 3 384-6251 Fax +64 3 384-6455 sales@sew-eurodrive.co.nz

Norway			
Assembly **Sales** **Service**	**Moss**	SEW-EURODRIVE A/S Solgaard skog 71 N-1599 Moss	Tel. +47 69 241-020 Fax +47 69 241-040 http://www.sew-eurodrive.no sew@sew-eurodrive.no

Peru			
Assembly **Sales** **Service**	**Lima**	SEW DEL PERU MOTORES REDUCTORES S.A.C. Los Calderos, 120-124 Urbanizacion Industrial Vulcano, ATE, Lima	Tel. +51 1 3495280 Fax +51 1 3493002 http://www.sew-eurodrive.com.pe sewperu@sew-eurodrive.com.pe

Poland			
Assembly **Sales** **Service**	**Lodz**	SEW-EURODRIVE Polska Sp.z.o.o. ul. Techniczna 5 PL-92-518 Łódź	Tel. +48 42 67710-90 Fax +48 42 67710-99 http://www.sew-eurodrive.pl sew@sew-eurodrive.pl

Portugal			
Assembly **Sales** **Service**	**Coimbra**	SEW-EURODRIVE, LDA. Apartado 15 P-3050-901 Mealhada	Tel. +351 231 20 9670 Fax +351 231 20 3685 http://www.sew-eurodrive.pt infosew@sew-eurodrive.pt

Romania			
Sales **Service**	**Bucureşti**	Sialco Trading SRL str. Madrid nr.4 011785 Bucuresti	Tel. +40 21 230-1328 Fax +40 21 230-7170 sialco@sialco.ro

Russia			
Assembly **Sales** **Service**	**St. Petersburg**	ZAO SEW-EURODRIVE P.O. Box 36 195220 St. Petersburg Russia	Tel. +7 812 3332522 +7 812 5357142 Fax +7 812 3332523 http://www.sew-eurodrive.ru sew@sew-eurodrive.ru

Senegal			
Sales	**Dakar**	SENEMECA Mécanique Générale Km 8, Route de Rufisque B.P. 3251, Dakar	Tel. +221 849 47-70 Fax +221 849 47-71 senemeca@sentoo.sn

Serbia			
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Singapore			
Assembly **Sales** **Service**	**Singapore**	SEW-EURODRIVE PTE. LTD. No 9, Tuas Drive 2 Jurong Industrial Estate Singapore 638644	Tel. +65 68621701 Fax +65 68612827 http://www.sew-eurodrive.com.sg sewsingapore@sew-eurodrive.com

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	Žilina	SEW-Eurodrive SK s.r.o. ul. Vojtecha Spanyola 33 SK-010 01 Žilina	Tel. +421 41 700 2513 Fax +421 41 700 2514 sew@sew-eurodrive.sk
	Banská Bystrica	SEW-Eurodrive SK s.r.o. Rudlovská cesta 85 SK-97411 Banská Bystrica	Tel. +421 48 414 6564 Fax +421 48 414 6566 sew@sew-eurodrive.sk

Slovenia			
Sales **Service**	**Celje**	Pakman - Pogonska Tehnika d.o.o. UI. XIV. divizije 14 SLO - 3000 Celje	Tel. +386 3 490 83-20 Fax +386 3 490 83-21 pakman@siol.net

South Africa			
Assembly **Sales** **Service**	**Johannesburg**	SEW-EURODRIVE (PROPRIETARY) LIMITED Eurodrive House Cnr. Adcock Ingram and Aerodrome Roads Aeroton Ext. 2 Johannesburg 2013 P.O.Box 90004 Bertsham 2013	Tel. +27 11 248-7000 Fax +27 11 494-3104 http://www.sew.co.za dross@sew.co.za
	Capetown	SEW-EURODRIVE (PROPRIETARY) LIMITED Rainbow Park Cnr. Racecourse & Omuramba Road Montague Gardens Cape Town P.O.Box 36556 Chempet 7442 Cape Town	Tel. +27 21 552-9820 Fax +27 21 552-9830 Telex 576 062 dswanepoel@sew.co.za
	Durban	SEW-EURODRIVE (PROPRIETARY) LIMITED 2 Monaceo Place Pinetown Durban P.O. Box 10433, Ashwood 3605	Tel. +27 31 700-3451 Fax +27 31 700-3847 dtait@sew.co.za

Spain			
Assembly **Sales** **Service**	**Bilbao**	SEW-EURODRIVE ESPAÑA, S.L. Parque Tecnológico, Edificio, 302 E-48170 Zamudio (Vizcaya)	Tel. +34 94 43184-70 Fax +34 94 43184-71 http://www.sew-eurodrive.es sew.spain@sew-eurodrive.es

Sweden			
Assembly **Sales** **Service**	**Jönköping**	SEW-EURODRIVE AB Gnejsvägen 6-8 S-55303 Jönköping Box 3100 S-55003 Jönköping	Tel. +46 36 3442-00 Fax +46 36 3442-80 http://www.sew-eurodrive.se info@sew-eurodrive.se

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Tunisia			
Sales	**Tunis**	T. M.S. Technic Marketing Service 5, Rue El Houdaibiah 1000 Tunis	Tel. +216 71 4340-64 + 71 4320-29 Fax +216 71 4329-76 tms@tms.com.tn

Turkey			
Assembly **Sales** **Service**	**Istanbul**	SEW-EURODRIVE Hareket Sistemleri San. ve Tic. Ltd. Sti. Bagdat Cad. Koruma Cikmazi No. 3 TR-34846 Maltepe ISTANBUL	Tel. +90 216 4419163 / 164 3838014/15 Fax +90 216 3055867 http://www.sew-eurodrive.com.tr sew@sew-eurodrive.com.tr

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	Philadelphia/PA	SEW-EURODRIVE INC. Pureland Ind. Complex 2107 High Hill Road, P.O. Box 481 Bridgeport, New Jersey 08014	Tel. +1 856 467-2277 Fax +1 856 845-3179 csbridgeport@seweurodrive.com
	Dayton	SEW-EURODRIVE INC. 2001 West Main Street Troy, Ohio 45373	Tel. +1 937 335-0036 Fax +1 937 440-3799 cstroy@seweurodrive.com
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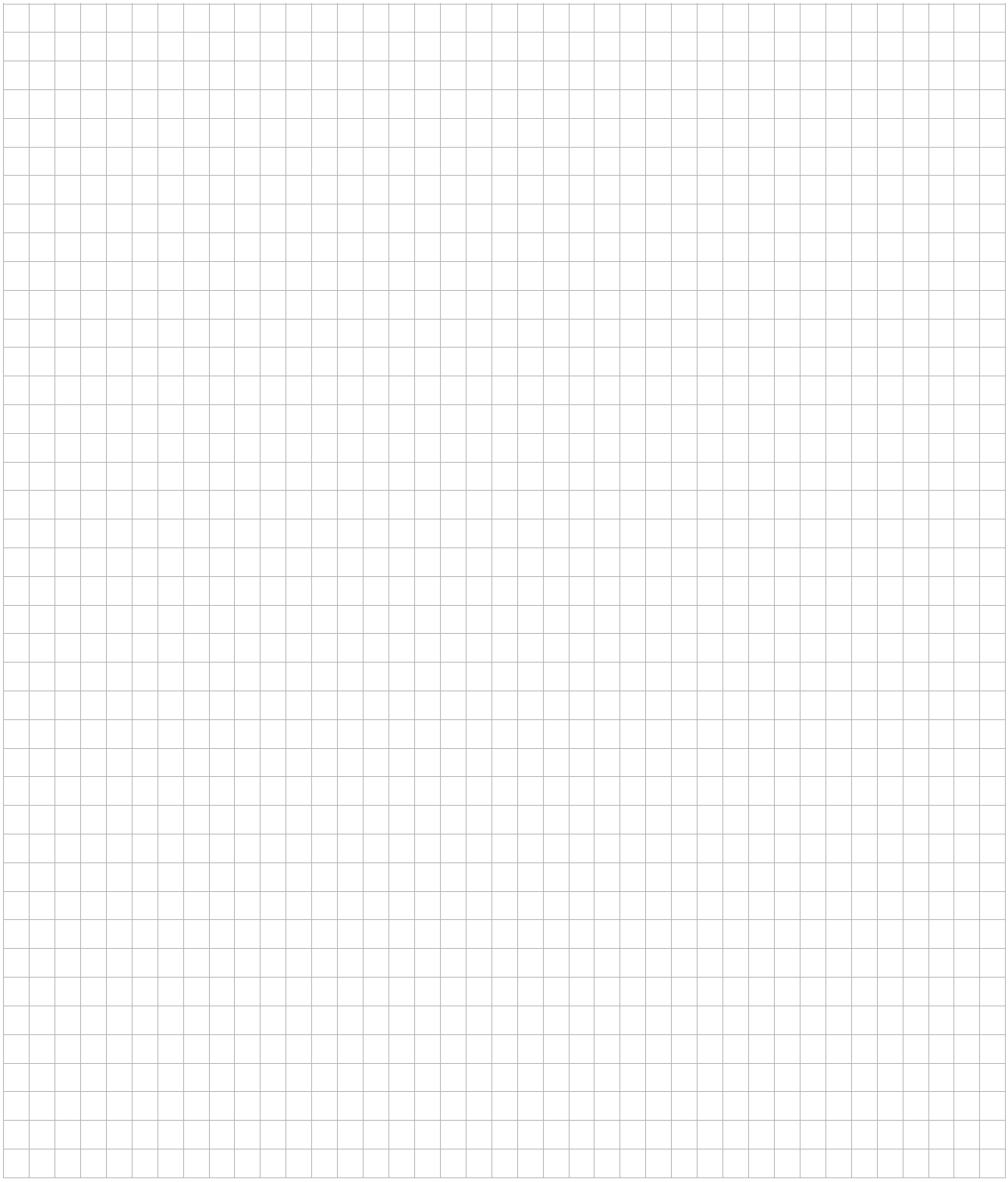

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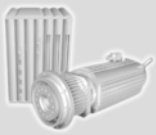

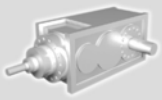

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